Online Appendix for

"Belief updating beyond the two-state setting"

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A. Additional Graphical Evidence on Multi-State Settings

Figure A.1. Point Estimates and Information Weight in Two-State and Multi-State Settings ($d = 1$).

Note. This figure shows the relationship between point estimates p_S according to Bayes' law and information weight w for different numbers of possible states of the world n. In the corresponding settings, n urns generate black balls with probabilities $1/(n+1)$, $2/(n+1)$, ..., $n/(n+1)$. p_S is the expected proportion of black balls in a randomly selected urn after observing a signal set consisting of a white balls and b black balls with $w = a + b$ and $d = b - a$. All lines refer to $d = 1$. Point estimates are stated in percent.

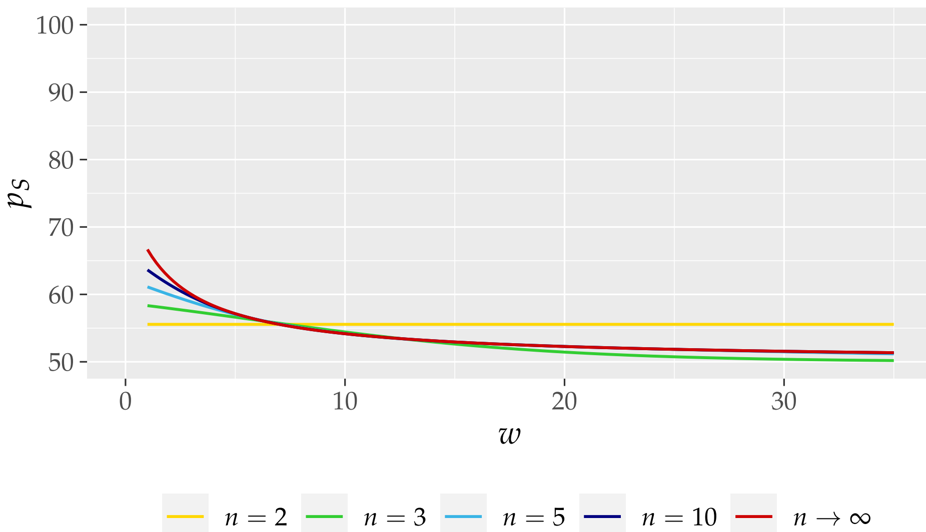
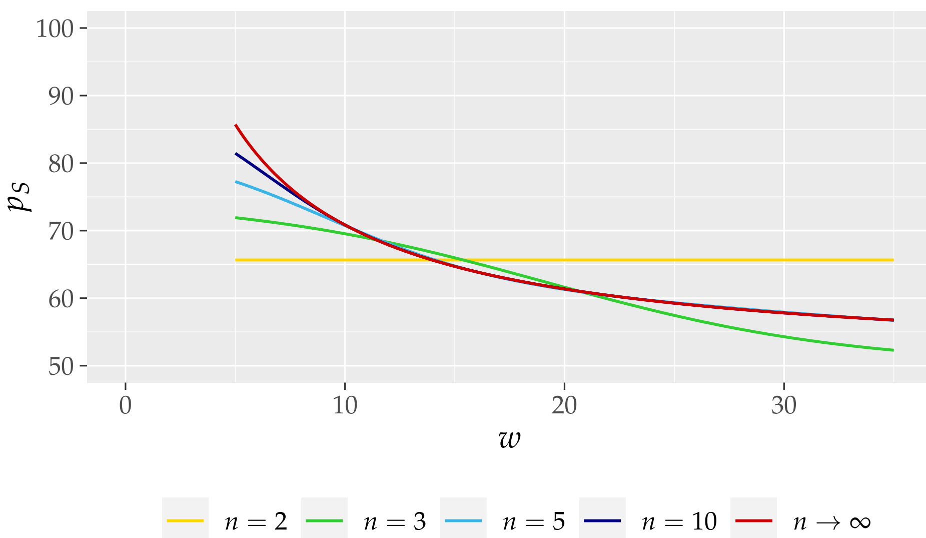


Figure A.2. Point Estimates and Information Weight in Two-State and Multi-State Settings ($d = 5$).

Note. This figure shows the relationship between point estimates p_S according to Bayes' law and information weight w for different numbers of possible states of the world n. In the corresponding settings, n urns generate black balls with probabilities $1/(n+1)$, $2/(n+1)$, ..., $n/(n+1)$. p_S is the expected proportion of black balls in a randomly selected urn after observing a signal set consisting of a white balls and b black balls with $w = a + b$ and $d = b - a$. All lines refer to $d = 5$. Point estimates are stated in percent.



B. Median Judgment Including Confidence Intervals

Figure B.1. Information Weight and State Probability Ratios in *dist*-Treatments.
Note. This figure shows the probability ratios x_S for treatment T^{dist}_{2urn} (Panel A), x_S for treatment T^{dist}_{3urn} (Panel B), and m_S for treatment T^{dist}_{3urn} (Panel C). Experimental subjects observed signal sets consisting of a white balls and b black balls; w denotes the weight of a signal set ($w = a + b$) and d its absolute difference in signal numbers ($d = b - a$). For each signal set, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T^{dist}_{2urn} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T^{dist}_{3urn}. Based on these stated probabilities, we calculate the probability ratios $x_{Si} = P_{Si}(B)/(P_{Si}(A) + P_{Si}(B))$ for T^{dist}_{2urn} and T^{dist}_{3urn} and $m_{Si} = P_{Si}(M)/(P_{Si}(A) + P_{Si}(B))$ for T^{dist}_{3urn}. The dashed lines depict median probability ratios $\widetilde{x}_S$ and $\widetilde{m}_S$ across subjects with whiskers indicating 95% confidence intervals. The solid lines depict the corresponding probability ratios x^*_S and m^*_S according to Bayes' law. Ordinates for all graphs are log-scaled.

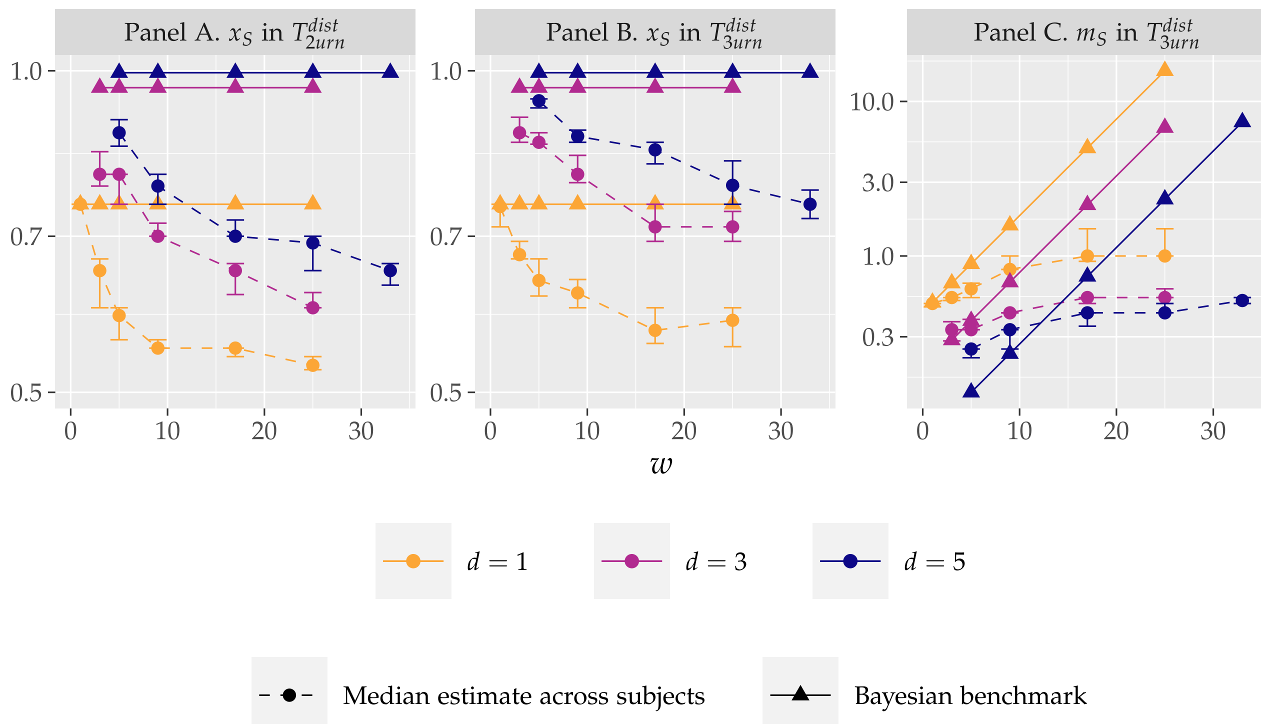


Figure B.2. Information Weight and Point Estimates in *dist*-Treatments.
Note. This figure shows the relationship between information weight w and point estimates p_S for treatments T^{dist}_{2urn} (Panel A) and T^{dist}_{3urn} (Panel B). Experimental subjects observed signal sets consisting of a white balls and b black balls; w denotes the weight of a signal set ($w = a + b$) and d its absolute difference in signal numbers ($d = b - a$). For each signal set, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T^{dist}_{2urn} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T^{dist}_{3urn}. Based on these stated probabilities, we calculate subjects' implicitly expected proportion of black balls in the selected urn as $p_{Si} = 0.25P_{Si}(A) + 0.75P_{Si}(B)$ and $p_{Si} = 0.25P_{Si}(A) + 0.5P_{Si}(M) + 0.75P_{Si}(B)$, respectively. The dashed lines depict median point estimates $\tilde{p}_S$ across subjects with whiskers indicating 95% confidence intervals. The solid lines depict the corresponding normative benchmark p^*_S. Point estimates are stated in percent.

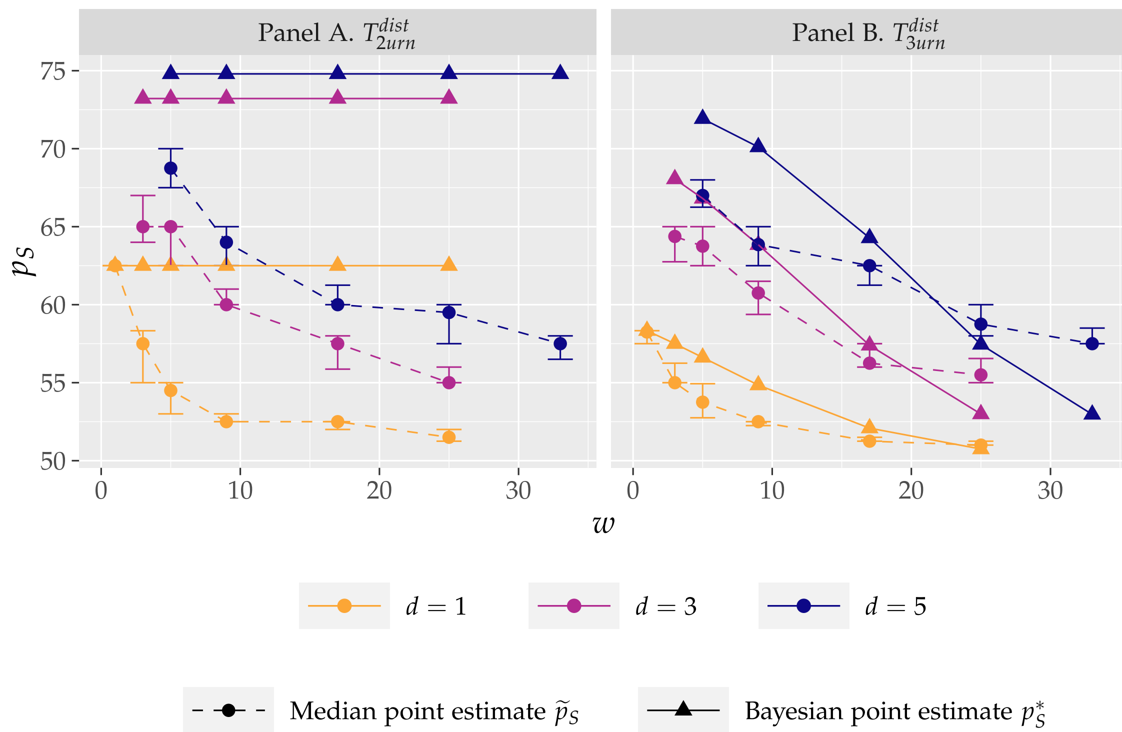
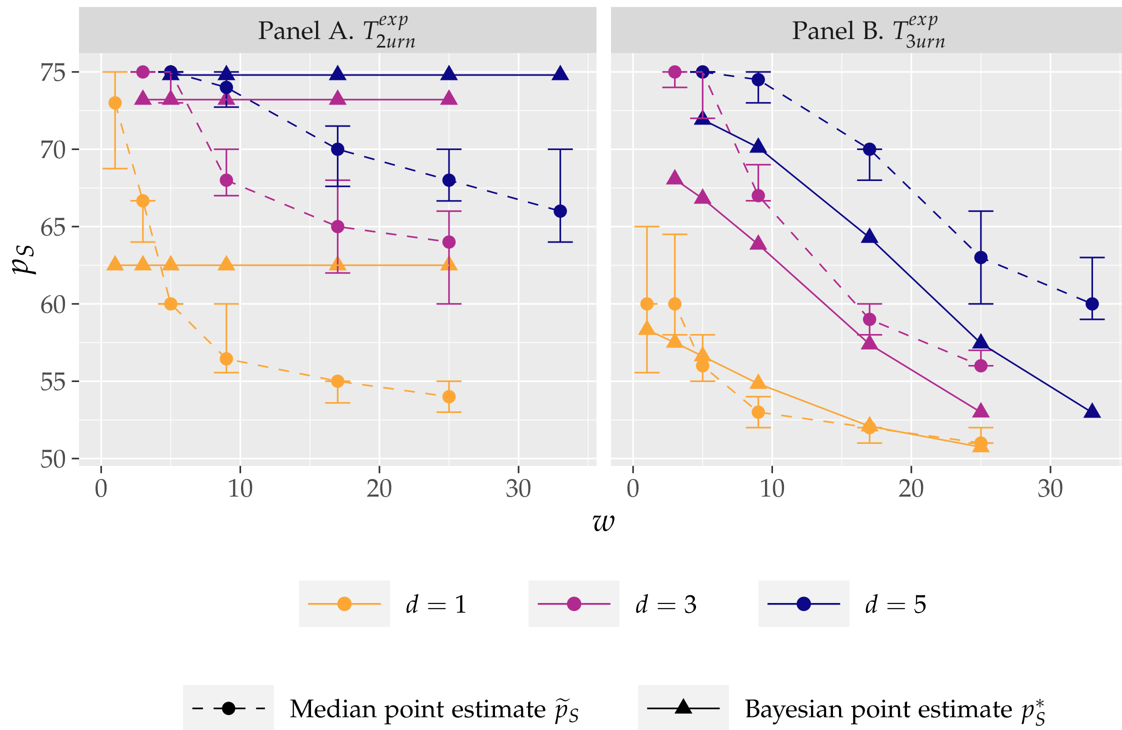


Figure B.3. Information Weight and Point Estimates in *exp*-Treatments.
Note. This figure shows the relationship between information weight w and point estimates p_S for treatments T^{exp}_{2urn} (Panel A) and T^{exp}_{3urn} (Panel B). Experimental subjects observed signal sets consisting of a white balls and b black balls; w denotes the weight of a signal set ($w = a + b$) and d its absolute difference in signal numbers ($d = b - a$). For each treatment and signal set, each subject i provided the expected proportion of black balls in the selected urn p_{Si}. The dashed lines depict median point estimates $\tilde{p}_S$ across subjects with whiskers indicating 95% confidence intervals. The solid lines depict the corresponding normative benchmark p^*_S. Point estimates are stated in percent.



C. Non-Linear Regressions

Considering the Bayesian benchmark in the two-state setting, the logarithm of the posterior state probabilities' odds ratio is the product of weight $w = a + b$, relative signal set proportion $s = (b - a)/(a + b)$, and the diagnosticity log odds ratio. This property allows Griffin and Tversky (1992) to estimate to which extent w and s influence subjects' judgment by means of simple log-log-regressions. As neither the normative benchmarks of the state probability ratios x_S and m_S nor their corresponding logarithmic values are proportional to w and s, we conduct non-linear regressions. The subject-level regression coefficients α_{wi} and α_{si} reflect to which extent w and s are acknowledged by subject i, respectively. If the state probability estimates of subject i are in line with the Bayesian benchmark, this implies $\alpha_{wi} = \alpha_{si} = 1$.

The regression equations and the resulting median estimates $\widetilde{\alpha}_w$ and $\widetilde{\alpha}_s$ across subjects are presented in Table C.1. Considering x_S in the two-state setting, $\widetilde{\alpha}_w$ is significantly lower than its normative benchmark of one. Hence, in line with the seminal findings of Griffin and Tversky (1992), subjects do not sufficiently acknowledge a signal set's information weight when updating beliefs. In line with our analyses in the main paper, this observation is qualitatively the same for x_S in the three-state setting. Considering m_S, $\widetilde{\alpha}_w$ is significantly lower than its normative benchmark. Again in line with the analyses in the main paper, this reflects that subjects do not sufficiently take into account information weight. The comparably low estimates $\widetilde{\alpha}_s$ in the last two columns reflect the observation from Panel C in Figure 4 of the main paper, that for a given level of w, m_S^* depends more strongly on the signal set composition than perceived by the experimental subjects.

Table C.1. Non-Linear Regression of State Probability Ratios on Signal Set Characteristics.
Note. This table provides median estimates of the coefficients α_{wi} and α_{si} from non-linear regressions of (log) state probability ratios on $w = a + b$ and $s = (b - a)/(a + b)$:

$$x_{Si} = \frac{3^{0.5s^{\alpha_{si}}*w^{\alpha_{wi}}}}{3^{0.5s^{\alpha_{si}}*w^{\alpha_{wi}}} + 3^{-0.5s^{\alpha_{si}}*w^{\alpha_{wi}}}} + u_{Si}, \qquad log(x_{Si}) = log\left(\frac{3^{0.5s^{\alpha_{si}}*w^{\alpha_{wi}}}}{3^{0.5s^{\alpha_{si}}*w^{\alpha_{wi}}} + 3^{-0.5s^{\alpha_{si}}*w^{\alpha_{wi}}}}\right) + u_{Si},$$

$$m_{Si} = \frac{(4/3)^{0.5*w^{\alpha_{wi}}}}{3^{0.5s^{\alpha_{si}}*w^{\alpha_{wi}}} + 3^{-0.5s^{\alpha_{si}}*w^{\alpha_{wi}}}} + u_{Si}, \qquad log(m_{Si}) = log\left(\frac{(4/3)^{0.5*w^{\alpha_{wi}}}}{3^{0.5s^{\alpha_{si}}*w^{\alpha_{wi}}} + 3^{-0.5s^{\alpha_{si}}*w^{\alpha_{wi}}}}\right) + u_{Si}.$$

The non-linear regressions are performed separately for each subject and information environment treatment by applying the Gauss-Newton algorithm. Note that we do not estimate α_{wi} and α_{si}, if the dependent variable cannot be calculated (i.e., if $P_{Si}(M) = 1$, $P_{Si}(M) = 0$, or $P_{Si}(B) = 0$), and that we only keep the corresponding estimates for subject i if the non-linear regression results in a unique optimum. z-values (in parentheses) are the result of a one sample sign test that determines whether the median coefficient is significantly different from the normative benchmark of one.

	T^{dist}_{2urn}		T^{dist}_{3urn}			
	x_{Si}	$log(x_{Si})$	x_{Si}	$log(x_{Si})$	m_{Si}	$log(m_{Si})$
$\widetilde{\alpha}_w$	0.3312	0.4903	0.4937	0.5546	0.7235	0.7404
	(13.76)	(9.97)	(12.12)	(9.91)	(10.88)	(11.47)
$\widetilde{\alpha}_s$	0.8518	0.9884	0.8074	0.8217	0.5745	0.5441
	(4.40)	(0.85)	(5.46)	(3.25)	(13.55)	(13.89)

D. Additional Analyses for exp-Treatments

Table D.1. Summary Statistics of Point Estimates in exp-Treatments.

Note. This table provides summary statistics of point estimates p_S for treatments T_{2urn}^{exp} and T_{3urn}^{exp}. Experimental subjects observed signal sets consisting of a white balls and b black balls; w denotes the weight of a signal set ($w = a + b$) and d its absolute difference in signal numbers ($d = b - a$). For each treatment and signal set, each subject i provided the expected proportion of black balls in the selected urn p_{Si}. p_S^* denotes the Bayesian benchmark and $\widetilde{p}_S$ subjects' median point estimate. $\widetilde{p}_S - p_S^*$ corresponds to the median judgment bias. Point estimates and biases are stated in percent.

				T_{2urn}^{exp}			T_{3urn}^{exp}		
a	b	w	d	p_S^*	$\widetilde{p}_S$	$\widetilde{p}_S - p_S^*$	p_S^*	$\widetilde{p}_S$	$\widetilde{p}_S - p_S^*$
0	1	1	1	62.50	73.00	10.50	58.33	60.00	1.67
1	2	3	1	62.50	66.67	4.17	57.50	60.00	2.50
0	3	3	3	73.21	75.00	1.79	68.06	75.00	6.94
2	3	5	1	62.50	60.00	-2.50	56.62	56.00	-0.62
1	4	5	3	73.21	75.00	1.79	66.81	75.00	8.19
0	5	5	5	74.80	75.00	0.20	71.92	75.00	3.08
4	5	9	1	62.50	56.45	-6.05	54.84	53.00	-1.84
3	6	9	3	73.21	68.00	-5.21	63.84	67.00	3.16
2	7	9	5	74.80	74.00	-0.80	70.11	74.50	4.39
8	9	17	1	62.50	55.00	-7.50	52.09	52.00	-0.09
7	10	17	3	73.21	65.00	-8.21	57.39	59.00	1.61
6	11	17	5	74.80	70.00	-4.80	64.28	70.00	5.72
12	13	25	1	62.50	54.00	-8.50	50.74	51.00	0.26
11	14	25	3	73.21	64.00	-9.21	52.99	56.00	3.01
10	15	25	5	74.80	68.00	-6.80	57.45	63.00	5.55
14	19	33	5	74.80	66.00	-8.80	52.97	60.00	7.03

Table D.2. Regression Analysis of Point Estimate Biases in exp-Treatments.

Note. This table provides median coefficients from regressing subjects' biases in point estimates as introduced in Equation (12) in the main paper on information weight ($w = a + b$) and signal difference ($d = b - a$) according to the following equation:

$$e_{pSi} = \gamma_{0i} + \gamma_{wi} w_S + \gamma_{di} d_S + u_{Si}$$

Regressions are performed separately for each subject and treatment (T_{2urn}^{exp} or T_{3urn}^{exp}). Note that we drop observations if the respective bias cannot be calculated. This is the case in the T_{2urn}^{exp} information environment as five observations correspond to $p_{Si} = 1$ and one observation to $p_{Si} = 0$. z-values (in parentheses) are the result of a one sample sign test that determines whether the median coefficient is significantly different from zero.

T_{2urn}^{exp}			T_{3urn}^{exp}		
$\widetilde{\gamma}_0$	$\widetilde{\gamma}_w$	$\widetilde{\gamma}_d$	$\widetilde{\gamma}_0$	$\widetilde{\gamma}_w$	$\widetilde{\gamma}_d$
0.1042	-0.0117	-0.0249	0.0265	0.0044	0.0180
(3.22)	(-5.55)	(-5.82)	(1.03)	(4.04)	(3.49)

E. Analysis of Griffin and Tversky (1992) Treatments

To calibrate our subject pool and replicate the findings of Griffin and Tversky (1992), we repeat our analyses of the two-state information environments from the main paper for the information environments T_{GT}^{dist} and T_{GT}^{exp}. These environments closely resemble T_{2urn}^{dist} and T_{2urn}^{exp}, respectively, but the diagnosticity level is $q = 0.6$ instead of $q = 0.75$. In line with Griffin and Tversky (1992) and our two-state findings in the main paper, subjects' point estimates decrease in information weight contrary to the Bayesian benchmark.

Figure E.1. Information Weight and Point Estimates in GT-Treatments.
Note. This figure shows the relationship between information weight w and point estimates p_S for treatments T_{GT}^{dist} (Panel A) and T_{GT}^{exp} (Panel B). Experimental subjects observed signal sets consisting of a white balls and b black balls; w denotes the weight of a signal set ($w = a + b$) and d its absolute difference in signal numbers ($d = b - a$). For each signal set in the exp-treatment, each subject i provided the expected proportion of black balls in the selected urn p_{Si}. For each signal set in the $dist$-treatment, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$). Based on these stated probabilities, we calculate subjects' implicitly expected proportion of black balls in the selected urn as $p_{Si} = 0.4P_{Si}(A) + 0.6P_{Si}(B)$. The dashed lines depict median point estimates $\tilde{p}_S$ across subjects. The solid lines depict the corresponding normative benchmark p_S^*. Point estimates are stated in percent.

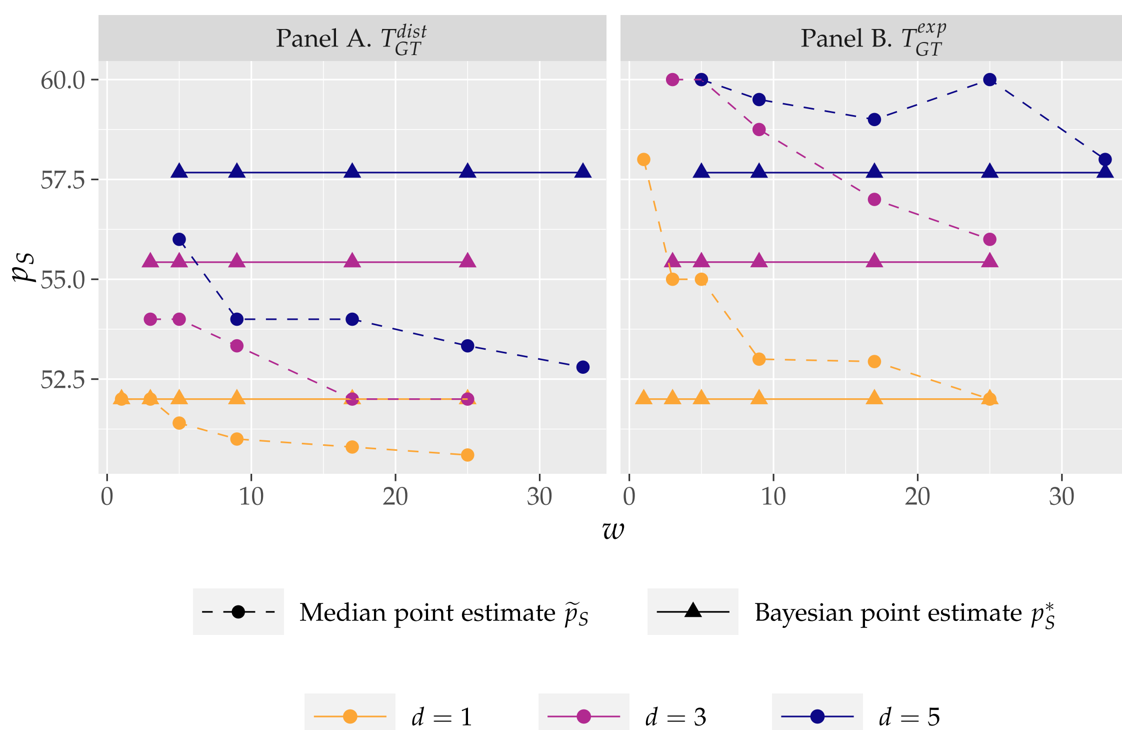


Table E.1. Summary Statistics of Point Estimates in *GT*-Treatments.

Note. This table provides summary statistics of point estimates p_S for treatments T_{GT}^{dist} and T_{GT}^{exp}. Experimental subjects observed signal sets consisting of a white balls and b black balls; w denotes the weight of a signal set ($w = a + b$) and d its absolute difference in signal numbers ($d = b - a$). For each signal set in the exp-treatment, each subject i provided the expected proportion of black balls in the selected urn p_{Si}. For each signal set in the $dist$-treatment, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$). Based on these stated probabilities, we calculate subjects' implicitly expected proportion of black balls in the selected urn as $p_{Si} = 0.4P_{Si}(A) + 0.6P_{Si}(B)$. p_S^* denotes the Bayesian benchmark and $\widetilde{p}_S$ subjects' median point estimate. $\widetilde{p}_S - p_S^*$ corresponds to the median judgment bias. Point estimates and biases are stated in percent.

				T_{GT}^{dist}			T_{GT}^{exp}		
a	b	w	d	p_S^*	$\widetilde{p}_S$	$\widetilde{p}_S - p_S^*$	p_S^*	$\widetilde{p}_S$	$\widetilde{p}_S - p_S^*$
0	1	1	1	52.00	52.00	0.00	52.00	58.00	6.00
1	2	3	1	52.00	52.00	0.00	52.00	55.00	3.00
0	3	3	3	55.43	54.00	-1.43	55.43	60.00	4.57
2	3	5	1	52.00	51.40	-0.60	52.00	55.00	3.00
1	4	5	3	55.43	54.00	-1.43	55.43	60.00	4.57
0	5	5	5	57.67	56.00	-1.67	57.67	60.00	2.33
4	5	9	1	52.00	51.00	-1.00	52.00	53.00	1.00
3	6	9	3	55.43	53.33	-2.09	55.43	58.75	3.32
2	7	9	5	57.67	54.00	-3.67	57.67	59.50	1.83
8	9	17	1	52.00	50.80	-1.20	52.00	52.94	0.94
7	10	17	3	55.43	52.00	-3.43	55.43	57.00	1.57
6	11	17	5	57.67	54.00	-3.67	57.67	59.00	1.33
12	13	25	1	52.00	50.60	-1.40	52.00	52.00	0.00
11	14	25	3	55.43	52.00	-3.43	55.43	56.00	0.57
10	15	25	5	57.67	53.33	-4.34	57.67	60.00	2.33
14	19	33	5	57.67	52.80	-4.87	57.67	58.00	0.33

Table E.2. Regression Analysis of Point Estimate Biases in *GT*-Treatments.

Note. This table provides median coefficients from regressing subjects' biases in point estimates as introduced in Equation (12) in the main paper on information weight ($w = a + b$) and signal difference ($d = b - a$) according to the following equation:

$$e_{pSi} = \gamma_{0i} + \gamma_{wi} w_S + \gamma_{di} d_S + u_{Si}$$

Regressions are performed separately for each subject and treatment (T_{GT}^{dist} or T_{GT}^{exp}). Note that we drop observations if the respective bias cannot be calculated. This is the case in the T_{GT}^{exp} information environment as three observations correspond to $p_{Si} = 1$. z-values (in parentheses) are the result of a one sample sign test to determine whether the median coefficient is significantly different from zero.

T_{GT}^{dist}			T_{GT}^{exp}		
$\widetilde{\gamma}_0$	$\widetilde{\gamma}_w$	$\widetilde{\gamma}_d$	$\widetilde{\gamma}_0$	$\widetilde{\gamma}_w$	$\widetilde{\gamma}_d$
0.0247	-0.0022	-0.0254	0.1483	-0.0034	-0.0140
(6.37)	(-10.21)	(-12.40)	(9.80)	(-5.41)	(-4.18)

F. State Probabilities in *dist*-Treatments

Table F.1. Summary Statistics of State Probabilities in *dist*-Treatments.
Note. This table provides summary statistics of state probabilities for treatments T^{dist}_{2urn} and T^{dist}_{3urn}. Experimental subjects observed signal sets consisting of a white balls and b black balls; w denotes the weight of a signal set ($w = a + b$) and d its absolute difference in signal numbers ($d = b - a$). For each signal set, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T^{dist}_{2urn} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T^{dist}_{3urn}. The corresponding probabilities P^*_S denote the normatively correct value according to Bayes' law. $\widetilde{P}_S$ denotes the subjects' median posterior probability estimate. All posterior probabilities are stated in percent.

				T^{dist}_{2urn}				T^{dist}_{3urn}					
a	b	w	d	$P^*_S(A)$	$P^*_S(B)$	$\widetilde{P}_S(A)$	$\widetilde{P}_S(B)$	$P^*_S(A)$	$P^*_S(M)$	$P^*_S(B)$	$\widetilde{P}_S(A)$	$\widetilde{P}_S(M)$	$\widetilde{P}_S(B)$
0	1	1	1	25.00	75.00	25.00	75.00	16.67	33.33	50.00	17.00	33.00	50.00
1	2	3	1	25.00	75.00	35.00	65.00	15.00	40.00	45.00	20.00	35.00	42.40
0	3	3	3	3.57	96.43	20.00	80.00	2.78	22.22	75.00	10.00	25.00	66.00
2	3	5	1	25.00	75.00	41.00	59.00	13.24	47.06	39.71	20.00	38.00	37.00
1	4	5	3	3.57	96.43	20.00	80.00	2.59	27.59	69.83	10.00	25.00	63.00
0	5	5	5	0.41	99.59	12.50	87.50	0.36	11.59	88.04	5.00	20.00	75.00
4	5	9	1	25.00	75.00	45.00	55.00	9.69	61.24	29.07	20.00	45.00	34.00
3	6	9	3	3.57	96.43	30.00	70.00	2.13	40.38	57.49	12.62	30.00	55.00
2	7	9	5	0.41	99.59	22.00	78.00	0.33	18.91	80.76	10.00	25.00	65.00
8	9	17	1	25.00	75.00	45.00	55.00	4.17	83.32	12.51	15.33	50.00	29.00
7	10	17	3	3.57	96.43	35.00	65.00	1.14	68.16	30.71	16.00	35.00	45.00
6	11	17	5	0.41	99.59	30.00	70.00	0.24	42.43	57.34	10.00	30.00	60.00
12	13	25	1	25.00	75.00	47.00	53.00	1.49	94.04	4.47	15.00	50.00	25.10
11	14	25	3	3.57	96.43	40.00	60.00	0.46	87.12	12.42	15.00	35.00	40.00
10	15	25	5	0.41	99.59	31.00	69.00	0.12	69.96	29.92	15.00	30.00	50.00
14	19	33	5	0.41	99.59	35.00	65.00	0.05	88.04	11.91	15.00	34.00	49.00

G. Alternative Bias Measures

Table G.1. Regression of Biases in State Probability Ratios on Signal Set Characteristics.
Note. This table provides median coefficients from regressing biases in state probability ratios on information weight ($w = a + b$) and signal difference ($d = b - a$), that is,

$$e_{xSi} = \gamma_{0i} + \gamma_{wi} w_S + \gamma_{di} d_S + u_{Si} \quad \text{and} \quad e_{mSi} = \gamma_{0i} + \gamma_{wi} w_S + \gamma_{di} d_S + u_{Si}.$$

The biases are defined based on simple differences in state probability ratios, that is, $e_{xSi} = x_{Si} - x_S^*$ and $e_{mSi} = m_{Si} - m_S^*$. Regressions are performed separately for each subject and treatment (T_{2urn}^{dist} or T_{3urn}^{dist}). Note that we drop observations if the respective bias cannot be calculated. This is the case in the T_{3urn}^{dist} information environment as three observations correspond to $P_{Si}(M) = 1$. z-values (in parentheses) are the result of a one sample sign test that determines whether the median coefficient is significantly different from zero.

T_{2urn}^{dist}			T_{3urn}^{dist}					
e_x (biases in x_S)			e_x (biases in x_S)			e_m (biases in m_S)		
$\widetilde{\gamma}_0$	$\widetilde{\gamma}_w$	$\widetilde{\gamma}_d$	$\widetilde{\gamma}_0$	$\widetilde{\gamma}_w$	$\widetilde{\gamma}_d$	$\widetilde{\gamma}_0$	$\widetilde{\gamma}_w$	$\widetilde{\gamma}_d$
-0.0928	-0.0059	-0.0182	-0.0559	-0.0042	-0.0131	-0.6695	-0.3496	1.0362
(-11.58)	(-12.40)	(-8.98)	(-5.82)	(-11.31)	(-5.82)	(-7.74)	(-13.91)	(12.54)

Table G.2. Regression Analysis of Point Estimate Biases in *dist*-Treatments.
Note. This table provides median coefficients from regressing subjects' biases in point estimates on information weight ($w = a + b$) and signal difference ($d = b - a$) according to the following equation:

$$e_{pSi} = \gamma_{0i} + \gamma_{wi} w_S + \gamma_{di} d_S + u_{Si}$$

Biases e_{pSi} are defined either based on simple differences in point estimates (i.e., $e_{pSi} = p_{Si} - p_S^*$ in Panel A) or based on differences in odds ratios (i.e., $e_{pSi} = p_{Si}/(1 - p_{Si}) - p_S^*/(1 - p_S^*)$ in Panel B). Regressions are performed separately for each subject and treatment (T_{2urn}^{dist} or T_{3urn}^{dist}). z-values (in parentheses) are the result of a one sample sign test that determines whether the median coefficient is significantly different from zero.

	T_{2urn}^{dist}			T_{3urn}^{dist}		
	$\widetilde{\gamma}_0$	$\widetilde{\gamma}_w$	$\widetilde{\gamma}_d$	$\widetilde{\gamma}_0$	$\widetilde{\gamma}_w$	$\widetilde{\gamma}_d$
Panel A	-0.0464	-0.0030	-0.0091	-0.0287	0.0032	-0.0086
	(-11.58)	(-12.40)	(-8.98)	(-9.25)	(13.22)	(-8.15)
Panel B	-0.1417	-0.0180	-0.1822	-0.1634	0.0216	-0.0778
	(-7.19)	(-12.26)	(-13.50)	(-8.29)	(13.09)	(-9.66)

H. Analyses Based on Particularly Attentive Subjects

The experimental subjects faced strenuous tasks. Overall, they had to evaluate 108 scenarios that varied by decision environment, signal set composition, and elicitation method. Some of these answers had natural bounds: in our symmetric setup, expected ball proportions should be in the interval defined by the two extreme urn compositions, and a majority of black balls should tilt judgment in the direction of the predominantly black urn. We decided not to force the provided answers to lie in these reasonable ranges. This allows distinguishing between subjects that carefully considered the relevant scenarios and provided (unforced) reasonable answers and those that did not fully apprehend our experimental setup or the tasks at hand and, consequently, provided unreasonable answers.

Because our analyses focus on the 64 questions with $q = 0.75$ (four combinations of information environment and elicitation methods with 16 unbalanced signal sets each) and consider the balanced signal sets and the questions used for the Griffin and Tversky (1992) replication only as auxiliary data, we look for unreasonable answers only in these 64 questions. For nine of our 213 subjects, we observe at least one point estimate in T^{exp}_{2urn} or T^{exp}_{3urn} that lies higher than 75% or lower than 25%.[1] A total of 94 subjects provided at least one answer that implied a directionally inconsistent point estimate of less than 50%. Finally, for 57 subjects, their judgment implied point estimates of only 50% or 75% for all unbalanced signal sets within at least one information environment. These subjects presumably did not state expected ball proportions but ball proportions of the urn that they considered to be most likely chosen.

We define a subgroup of particularly attentive subjects as consisting of those subjects who provided answers that did not suffer from any of the three previously mentioned problems. This subgroup comprises 83 subjects and forms the basis for the analyses presented in this subsection of the Online Appendix. More specifically, we replicate all figures and tables from the main paper with the restricted sample of 83 subjects. Our main conclusions remain virtually unchanged.

[1]Note that subjects who wanted to submit answers higher than 75% (lower than 25%) received a warning message reminding them that the proportion for either ball color across urns was between 25% and 75%. Subjects then had to indicate whether they wanted to change their answer or submit it despite the warning message. Nine subjects submitted their answers nonetheless.

Figure H.1. Information Weight and State Probability Ratios in *dist*-Treatments ($N = 83$).
Note. This figure shows the probability ratios x_S for treatment T^{dist}_{2urn} (Panel A), x_S for treatment T^{dist}_{3urn} (Panel B), and m_S for treatment T^{dist}_{3urn} (Panel C). Experimental subjects observed signal sets consisting of a white balls and b black balls; w denotes the weight of a signal set ($w = a + b$) and d its absolute difference in signal numbers ($d = b - a$). For each signal set, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T^{dist}_{2urn} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T^{dist}_{3urn}. Based on these stated probabilities, we calculate the probability ratios $x_{Si} = P_{Si}(B)/(P_{Si}(A) + P_{Si}(B))$ for T^{dist}_{2urn} and T^{dist}_{3urn} and $m_{Si} = P_{Si}(M)/(P_{Si}(A) + P_{Si}(B))$ for T^{dist}_{3urn}. The dashed lines depict median probability ratios $\tilde{x}_S$ and $\tilde{m}_S$ across subjects. The solid lines depict the corresponding probability ratios x^*_S and m^*_S according to Bayes' law. Ordinates for all graphs are log-scaled.

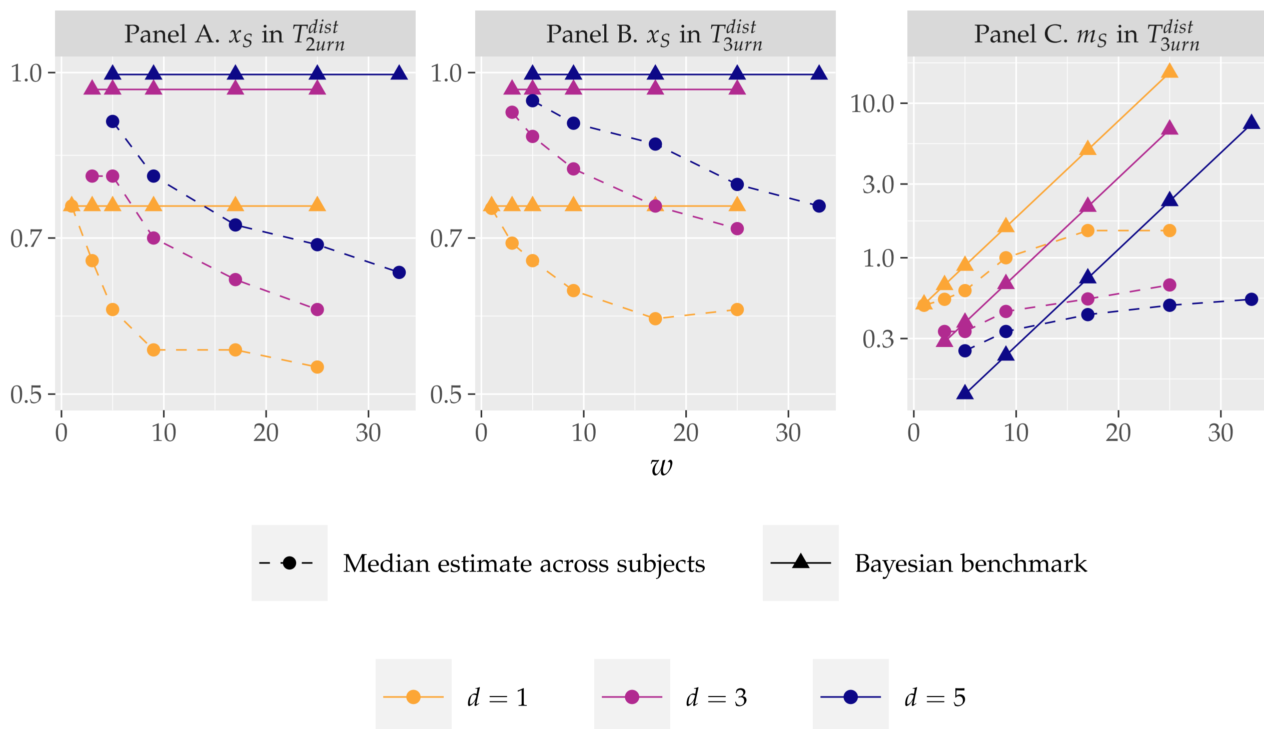


Table H.1. Regression of Biases in State Probability Ratios on Signal Set Characteristics ($N = 83$).

Note. This table provides median coefficients from regressing the biases in state probability ratios introduced in Equations (7) and (8) in the main paper on information weight ($w = a + b$) and signal difference ($d = b - a$), that is,

$$e_{xSi} = \gamma_{0i} + \gamma_{wi} w_S + \gamma_{di} d_S + u_{Si} \quad \text{and} \quad e_{mSi} = \gamma_{0i} + \gamma_{wi} w_S + \gamma_{di} d_S + u_{Si}.$$

Regressions are performed separately for each subject and treatment (T^{dist}_{2urn} or T^{dist}_{3urn}). z-values (in parentheses) are the result of a one sample sign test that determines whether the median coefficient is significantly different from zero.

T^{dist}_{2urn}			T^{dist}_{3urn}					
e_x (biases in x_S)			e_x (biases in x_S)			e_m (biases in m_S)		
$\widetilde{\gamma}_0$	$\widetilde{\gamma}_w$	$\widetilde{\gamma}_d$	$\widetilde{\gamma}_0$	$\widetilde{\gamma}_w$	$\widetilde{\gamma}_d$	$\widetilde{\gamma}_0$	$\widetilde{\gamma}_w$	$\widetilde{\gamma}_d$
-0.1318	-0.0074	-0.0063	-0.0919	-0.0052	-0.0011	-0.0743	-0.1005	0.1673
(-7.57)	(-8.45)	(-2.09)	(-4.72)	(-7.35)	(-0.33)	(-0.77)	(-8.67)	(5.82)

Figure H.2. Subject-Level State Probability Ratios for Signal Set $S_{7,10}$ ($N = 83$).
Note. For each of the 83 considered subjects i, this figure shows the state probability ratios x_{Si} and m_{Si} for signal set $S_{7,10}$ in treatments T^{dist}_{2urn} (Panel A) and T^{dist}_{3urn} (Panel B). After observing 7 white and 10 black balls, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T^{dist}_{2urn} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T^{dist}_{3urn}. Based on these stated probabilities, we calculate the probability ratios $x_{Si} = P_{Si}(B)/(P_{Si}(A) + P_{Si}(B))$ and $m_{Si} = P_{Si}(M)/(P_{Si}(A) + P_{Si}(B))$. These subject-level ratios are reflected by the blue dots while the red triangle corresponds to the Bayesian benchmark. The yellow and green lines show all state probability combinations that imply the Bayesian level of x_S and m_S, respectively. The red line in Panel B shows all combinations of state probability ratios that correspond to p^*_S, the Bayesian expected proportion of black balls in the selected urn. In the two-state case (Panel A), the red triangle reflects the only feasible combination that yields p^*_S.

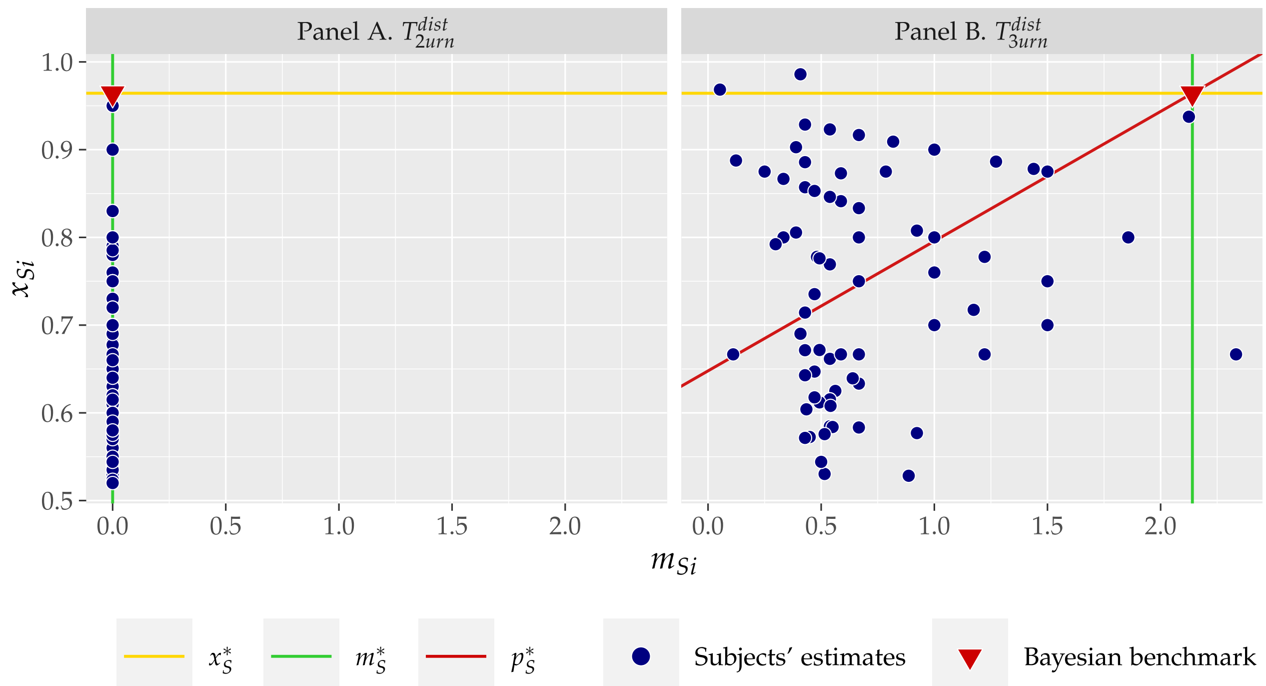


Figure H.3. Information Weight and Point Estimates in *dist*-Treatments ($N = 83$)
Note. This figure shows the relationship between information weight w and point estimates p_S for treatments T^{dist}_{2urn} (Panel A) and T^{dist}_{3urn} (Panel B). Experimental subjects observed signal sets consisting of a white balls and b black balls; w denotes the weight of a signal set ($w = a + b$) and d its absolute difference in signal numbers ($d = b - a$). For each signal set, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T^{dist}_{2urn} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T^{dist}_{3urn}. Based on these stated probabilities, we calculate subjects' implicitly expected proportion of black balls in the selected urn as $p_{Si} = 0.25P_{Si}(A) + 0.75P_{Si}(B)$ and $p_{Si} = 0.25P_{Si}(A) + 0.5P_{Si}(M) + 0.75P_{Si}(B)$, respectively. The dashed lines depict median point estimates $\widetilde{p}_S$ across subjects. The solid lines depict the corresponding normative benchmark p^*_S. Point estimates are stated in percent.

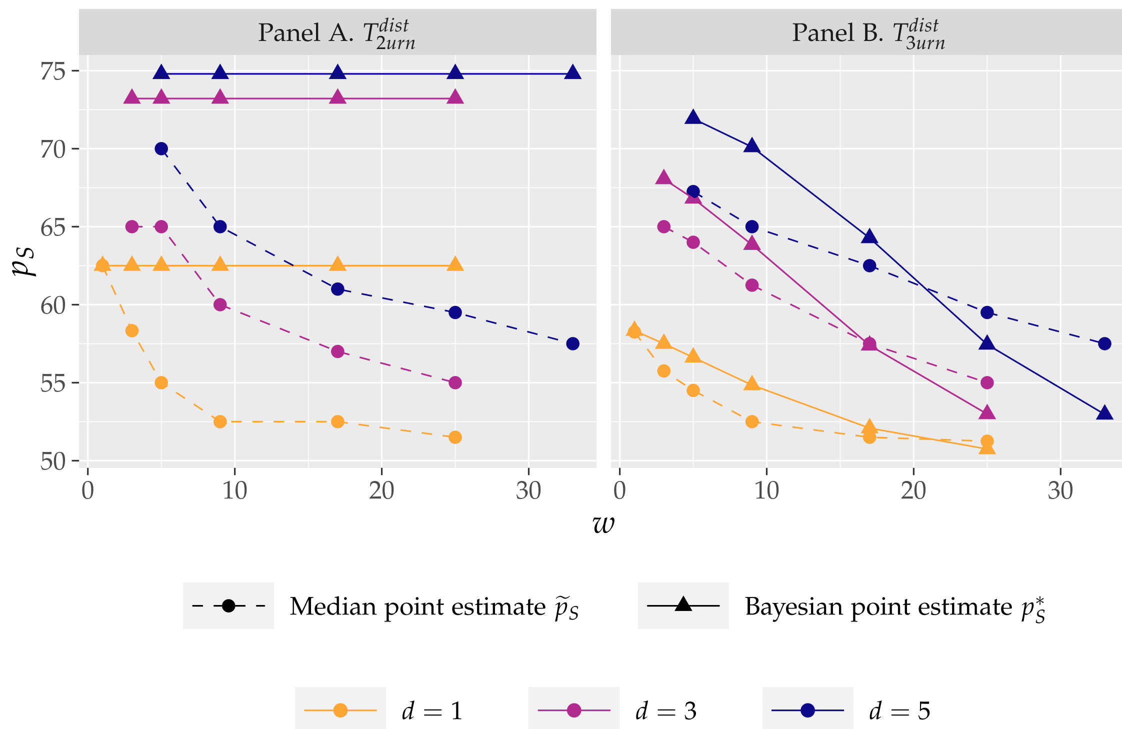


Table H.2. Summary Statistics of Point Estimates in *dist*-Treatments ($N = 83$).

Note. This table provides summary statistics of point estimates p_S for treatments T_{2urn}^{dist} and T_{3urn}^{dist}. Experimental subjects observed signal sets consisting of a white balls and b black balls; w denotes the weight of a signal set ($w = a + b$) and d its absolute difference in signal numbers ($d = b - a$). For each signal set, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T_{2urn}^{dist} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T_{3urn}^{dist}. Based on these stated probabilities, we calculate subjects' implicitly expected proportion of black balls in the selected urn as $p_{Si} = 0.25P_{Si}(A) + 0.75P_{Si}(B)$ and $p_{Si} = 0.25P_{Si}(A) + 0.5P_{Si}(M) + 0.75P_{Si}(B)$, respectively. p_S^* denotes the Bayesian benchmark and $\widetilde{p}_S$ subjects' median point estimate. $\widetilde{p}_S - p_S^*$ corresponds to the median judgment bias. Point estimates and biases are stated in percent.

				T_{2urn}^{dist}			T_{3urn}^{dist}		
a	b	w	d	p_S^*	$\widetilde{p}_S$	$\widetilde{p}_S - p_S^*$	p_S^*	$\widetilde{p}_S$	$\widetilde{p}_S - p_S^*$
0	1	1	1	62.50	62.50	0.00	58.33	58.25	-0.08
1	2	3	1	62.50	58.33	-4.17	57.50	55.75	-1.75
0	3	3	3	73.22	65.00	-8.22	68.06	65.00	-3.06
2	3	5	1	62.50	55.00	-7.50	56.62	54.50	-2.12
1	4	5	3	73.22	65.00	-8.22	66.81	64.00	-2.81
0	5	5	5	74.80	70.00	-4.80	71.92	67.25	-4.67
4	5	9	1	62.50	52.50	-10.00	54.84	52.50	-2.34
3	6	9	3	73.22	60.00	-13.22	63.84	61.25	-2.59
2	7	9	5	74.80	65.00	-9.80	70.11	65.00	-5.11
8	9	17	1	62.50	52.50	-10.00	52.09	51.50	-0.59
7	10	17	3	73.22	57.00	-16.22	57.39	57.50	0.11
6	11	17	5	74.80	61.00	-13.80	64.28	62.50	-1.78
12	13	25	1	62.50	51.50	-11.00	50.74	51.25	0.51
11	14	25	3	73.22	55.00	-18.22	52.99	55.00	2.01
10	15	25	5	74.80	59.50	-15.30	57.45	59.50	2.05
14	19	33	5	74.80	57.50	-17.30	52.97	57.50	4.53

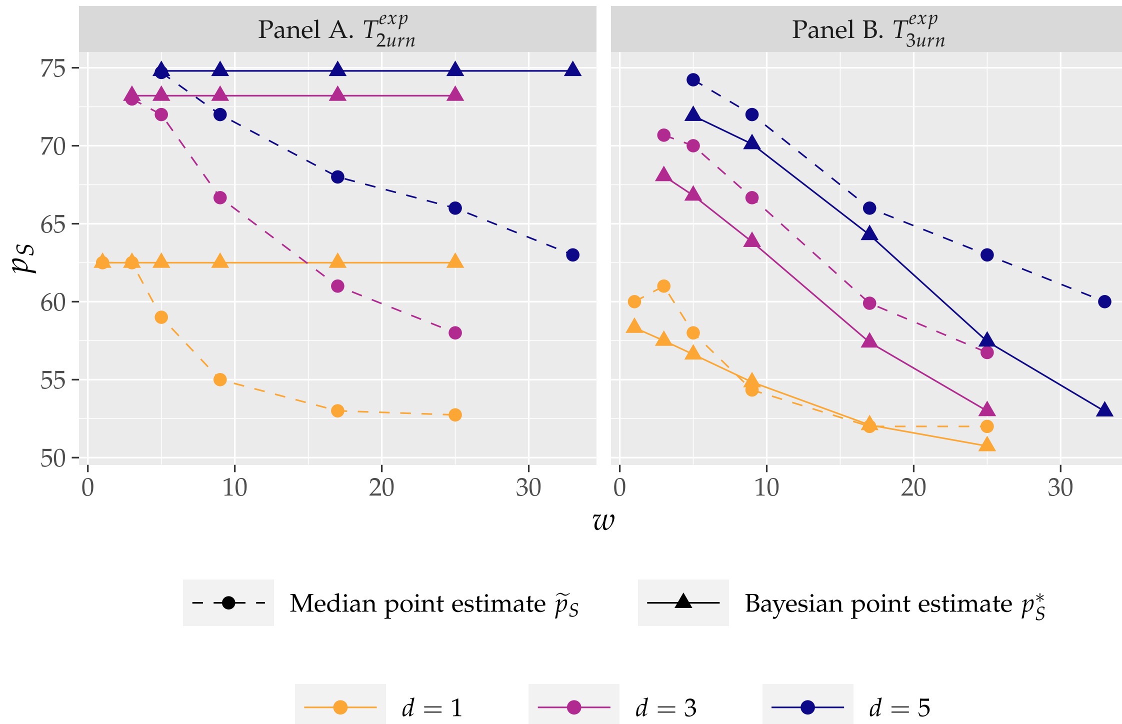
Table H.3. Regression Analysis of Point Estimate Biases in *dist*-Treatments ($N = 83$).
Note. This table provides median coefficients from regressing subjects' biases in point estimates as introduced in Equation (12) in the main paper on information weight ($w = a + b$) and signal difference ($d = b - a$) according to the following equation:

$$e_{pSi} = \gamma_{0i} + \gamma_{wi} w_S + \gamma_{di} d_S + u_{Si}$$

Regressions are performed separately for each subject and treatment (T^{dist}_{2urn} or T^{dist}_{3urn}). z-values (in parentheses) are the result of a one sample sign test that determines whether the median coefficient is significantly different from zero.

T^{dist}_{2urn}			T^{dist}_{3urn}		
$\widetilde{\gamma}_0$	$\widetilde{\gamma}_w$	$\widetilde{\gamma}_d$	$\widetilde{\gamma}_0$	$\widetilde{\gamma}_w$	$\widetilde{\gamma}_d$
-0.1405	-0.0105	-0.0555	-0.1107	0.0130	-0.0342
(-6.70)	(-7.79)	(-5.82)	(-5.60)	(8.67)	(-6.04)

Figure H.4. Information Weight and Point Estimates in *exp*-Treatments ($N = 83$).
Note. This figure shows the relationship between information weight w and point estimates p_S for treatments T^{exp}_{2urn} (Panel A) and T^{exp}_{3urn} (Panel B). Experimental subjects observed signal sets consisting of a white balls and b black balls; w denotes the weight of a signal set ($w = a + b$) and d its absolute difference in signal numbers ($d = b - a$). For each treatment and signal set, each subject i provided the expected proportion of black balls in the selected urn p_{Si}. The dashed lines depict median point estimates $\tilde{p}_S$ across subjects. The solid lines depict the corresponding normative benchmark p^*_S. Point estimates are stated in percent.



I. Demographics and Concluding Questionnaire

Table I.1. Subject Demographics.
Note. This table provides demographical information for our experimental subjects. Note that two subjects refrained from answering the personal questions. Therefore, demographic information are reported for only 211 out of the 213 participants.

		N	%
Gender	Female	71	33.65
	Male	139	65.88
	Diverse	1	0.47
Highest degree	A levels	198	93.84
	Bachelor	11	5.21
	Master	2	0.95
Field of study	Business	147	69.67
	Economics	23	10.90
	Information systems	30	14.22
	Other sciences	11	5.21
Age	mean	20.56	
	median	20	
	min	18	
	max	55	

Table I.2. Summary Statistics on Concluding Experimental Questions.
Note. This table provides answer frequencies for the questions concluding both sessions of our experiment. Frequencies are based on our main sample of 213 subjects. The exact questions can be found in Online Appendix Section J. Panel A shows how many subjects provided correct/incorrect answers for the three tasks of the Cognitive Reflection Test. Panel B shows how many subjects provided correct/incorrect answers of the Bayesian Updating Task of the Berlin Numeracy Test. Panel C shows subjects' expectations with respect to their payoff relative to the other subjects' payoffs. Panels D and E present how strongly subjects considered different aspects of the decision setup when providing posterior probabilities. While Panel D presents how subjects rate the absolute importance of these aspects, Panel E presents the relative importance for two-state versus three-state setting. Answers for Panels D and E were provided on 7-point Likert scales.

	A. Cognitive Reflection Test			B. Berlin Numeracy Test
	Lake	Ball	Machines	Bayesian Updating
Correct	174	143	148	118
Incorrect	39	70	65	95

C. Judgment on Relative Payout

Session 1			Session 2		
Less	Equal	More	Less	Equal	More
117	84	12	120	80	13

D. Overall Consideration of Decision Setup

	Not at all 1	2	3	4	5	6	Very strongly 7
Composition of urns	2	8	12	21	42	55	73
Number of balls	3	16	16	29	57	57	35
Difference black/white balls	12	17	20	29	46	55	34
Proportion black/white balls	3	5	13	27	33	63	69

E. Relative Consideration of Decision Setup

	Stronger for 2 urns 1	2	3	4	5	6	Stronger for 3 urns 7
Composition of urns	3	29	24	97	24	28	8
Number of balls	4	24	21	121	27	14	2
Difference black/white balls	3	23	35	114	22	13	3
Proportion black/white balls	7	27	25	99	37	12	6

J. Experimental Instructions

(Because instructions for both sessions of our experiment were widely similar, we present them jointly on the following pages. Whenever descriptions or questions differed between sessions, we mark that by using different text colors. Blue text was only part of the instructions for the first day of the experiment while orange text was only part of the instructions for the second day.)

Introduction

Welcome to the first second day of our experiment!

Both today and on the second day of the experiment, we will ask you various assessment questions about probabilities. As on the first day of the experiment, we will again ask you various assessment questions about probabilities. Based on your answers in the experiments, you will have the opportunity to earn money in each case. Therefore, please answer the questions as accurately as possible—but without using a calculator. You will receive your payment for both experiment days after entering payment information (Paypal or bank account) on the second day of the experiment. At the end of today's experiment, you will have the opportunity to enter your payment information (Paypal or bank account) to receive your compensation for the two days of the experiment.

In the following, you will first receive a general description of the experiment procedure. Please read this information carefully. Afterwards you will get to the actual experiment.

If you have any questions, please click "Ask for Help" in the upper left area of your zoom window. A member of the experiment management will then promptly take care of your question.

Payment information

Today's experiment consists of three parts. In each of these three parts we will ask you to give estimates of probabilities. Your answers in each of these parts are potentially relevant for the payout. Your payoff for today is made up of two components, which we explain below:

Component 1:

For your participation today you will receive a lump sum of 5 EUR.

Component 2:

In each of the three parts of the experiment, you will have to make a total of about 40 probability assessments. In all cases, these are situations in which an objectively correct probability exists. In each part of the experiment, one of your estimates is selected as relevant for the payout. Your payoff is then calculated from the absolute deviation of your answer from the correct value according to the following formula:

$$Payout\ in\ EUR = 5 - min(5, 0.5 * abs(given\ probability[\%] - correct\ probability[\%])).$$

Your payout is largest if the probability you entered exactly matches the correct probability. In this case it is 5 EUR. For each percentage point that your stated probability deviates from the correct probability in absolute terms, your payout is reduced by 50 cents, but by a maximum of 5 EUR. Thus, your payout cannot be negative.

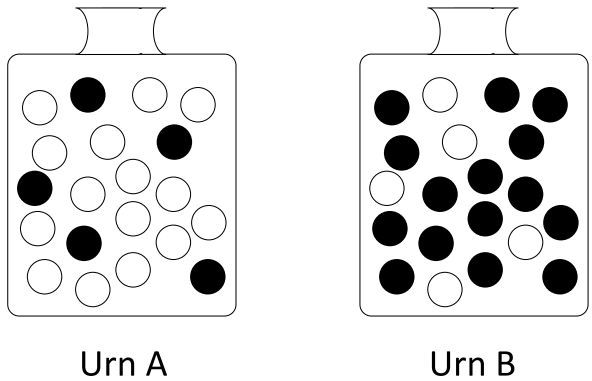
A numerical example: In a decision situation, you specify a probability of 55.5%, while the correct probability is 52.5%. In this case, the absolute deviation of both values is 3 percentage points, i.e. your variable payout here is $5 - 0.5 * 3 = 3.50 EUR$.

The maximum payout for today's part of the experiment is therefore 20 EUR (5 EUR flat participation fee plus 3 experiment parts, each with a maximum of 5 EUR).

Two-urn setting

General information

In this part of our experiment there are two identical looking urns A and B. The balls in the urns can be either white or black in color. In urn A, 75% of the balls are white and 25% of the balls are black. In urn B, 25% of the balls are white and 75% of the balls are black.



For each question, one of the two urns A or B is randomly selected (each with a probability of 1/2). You will not be told the result of this random selection. Subsequently, balls are drawn from the selected urn one after the other. The number of balls drawn depends on the particular question. Balls that are drawn are put back directly and can be drawn again. You will now be shown the number and colors of the drawn balls.

(The question mode is then described according to the respective treatment. Subsection headings (in italics) were not part of the experimental instructions but are included for reasons of clarity in this overview of experimental instructions.)

Question mode in dist-treatments. Using this information, you are asked to indicate the probability that the urn from which the balls were drawn is urn A or urn B.
Since urn B contains a relatively large number of black balls, the information about how many white and black balls were drawn helps you to indicate the probability that urn B was selected. For example, if a relatively large number of black balls were drawn, it is more likely that urn B was selected. For the next question, another urn is randomly selected again.

Question mode in exp-treatments. Using this information, you are asked to indicate the expected share of white and black balls in the selected urn. Therefore, you need to consider the probability of seeing the selected urn as well as the share of white and black balls in the respective urns. This expected value can be interpreted as the probability of seeing a white or black ball when drawing from the same urn again.

The urns contain a different number of white and black balls. This information helps you to indicate the share of white and black balls in the selected urn. For example, if a relatively large number of black balls were drawn, it is it is more likely that the share of black balls in the selected urn is relatively high. For the next question, another urn is randomly selected again.

Control questions

First, we would like to ask you a few control questions about the experiment to make sure you understood the structure and procedure of the experiment. To answer the questions, you can return to the previous page at any time to read the experiment instructions again. You can only begin answering the actual assessment questions once you have answered the control questions correctly. If you have problems answering the control questions, please contact the experiment director by clicking on "Ask for help" in your zoom window.

(1) How many different urns exist in this part of the experiment? *[1,**2**,3,4]*
(2) If no balls have been drawn from the selected urn yet, what is the probability that the urn is urn A? *[**1/2**,1/3,1/4,1/5]*
(3) If no balls have been drawn from the selected urn yet, what is the expected proportion of white balls in the selected urn? ***50%***
(4) Which proportion of white balls do you expect in the selected urn if urn A was selected? ***75%***
(5) Is the following statement true or false: 'Drawn balls are returned directly to the urn.'? *[**true**, false]*
(6) Is the following statement true or false: 'For each question, a new urn is chosen randomly.'? *[**true**, false]*
(7) Which of the following are you asked to estimate? *[probability that a certain urn was selected, expected proportion of white and black balls in the selected urn]*

(For the multiple choice questions, the available answer options are provided in brackets. The remaining questions were answered by entering numbers in a text box. Bold font marks the correct answers. For question (7) the correct answer depends on the question mode in the respective treatment.)

Judgment task screenshots

Figure J.1. Screenshot from T_{2urn}^{dist}-treatment.

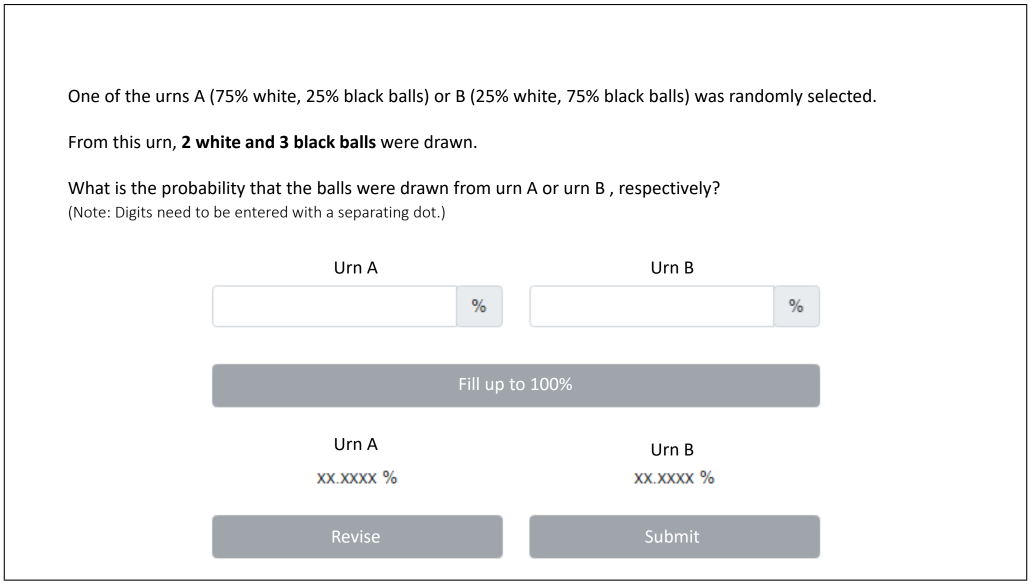
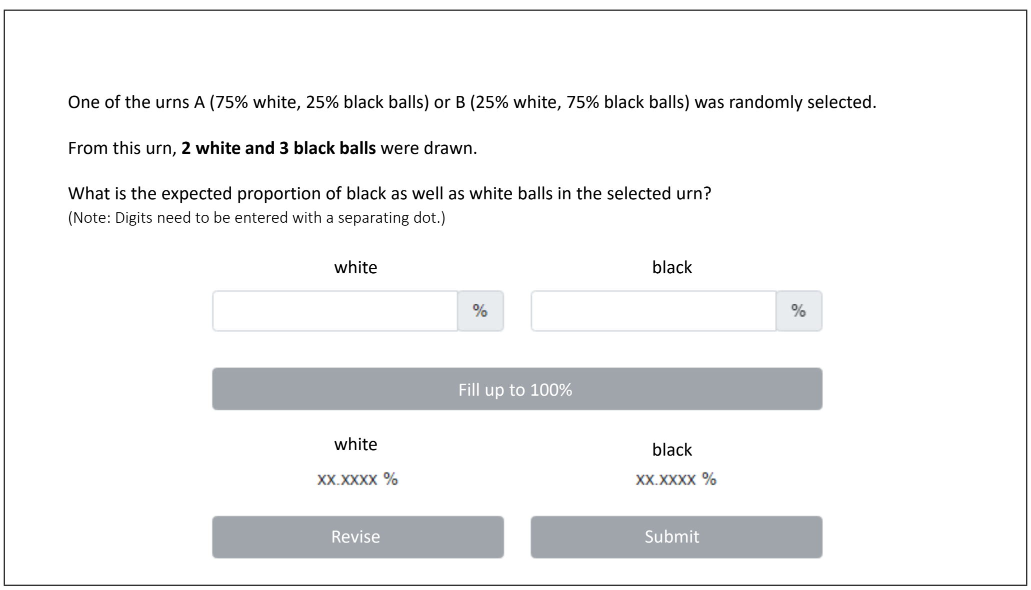


Figure J.2. Screenshot from T_{2urn}^{exp}-treatment.

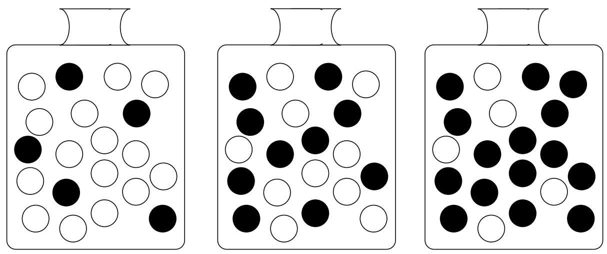


(For reasons of brevity we only included a screenshot for one of the 19 signal sets within the respective treatments.)

Three-urn setting

General information

In this part of our experiment, there are three identical looking urns A, B and C. The balls in the urns can be either white or black. In urn A, 75% of the balls are white and 25% of the balls are black. In urn B, 50% of the balls are white and 50% of the balls are black. In urn C, 25% of the balls are white and 75% of the balls are black.



For each question, one of the urns A, B or C is randomly selected (each with a probability of 1/3). You will not be told the result of this random selection. Then balls are drawn from the selected urn one by one. The number of balls drawn depends on the particular question. Balls that are drawn are put back directly and can be drawn again. You will now be shown the number and colors of the drawn balls.

(The question mode is then described according to the respective treatment. Subsection headings (in italics) were not part of the experimental instructions but are included for reasons of clarity in this overview of experimental instructions.)

Question mode in dist-treatments. Using this information, you are asked to indicate the probability that the selected urn from which the balls were drawn is urn A, urn B, or urn C. Since urn C contains a relatively large number of black balls, the information about how many white and black balls were drawn will help you to indicate the probability that urn C was selected. For example, if a relatively large number of black balls were drawn, it is more likely that urn C was selected. For the next question, another urn is randomly selected again.

Question mode in exp-treatments. Using this information, you are asked to indicate the expected share of white and black balls in the selected urn. Therefore, you need to consider the probability of seeing the selected urn as well as the share of white and black balls in the respective urns. This expected value can be interpreted as the probability of seeing a white or black ball when drawing from the same urn again.
The urns contain a different number of white and black balls. This information helps you to indicate the share of white and black balls in the selected urn. For example, if a relatively large number of black balls were drawn, it is it is more likely that the share of black balls in the selected urn is relatively high. For the next question, another urn is randomly selected again.

Control questions

First, we would like to ask you a few control questions about the experiment to make sure you understood the structure and procedure of the experiment. To answer the questions, you can return to the previous page at any time to read the experiment instructions again. You can only begin answering the actual assessment questions once you have answered the control questions correctly. If you have problems answering the control questions, please contact the experiment director by clicking on "Ask for help" in your zoom window.

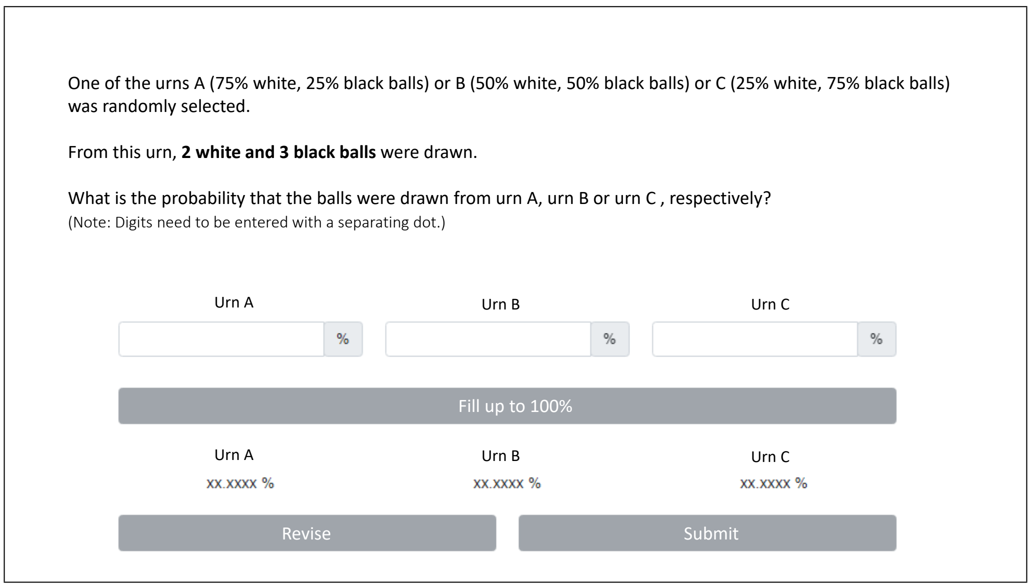
(1) How many different urns exist in this part of the experiment? *[1,2,**3**,4]*
(2) If no balls have been drawn from the selected urn yet, what is the probability that the urn is urn A? *[1/2,**1/3**,1/4,1/5]*
(3) If no balls have been drawn from the selected urn yet, what is the expected proportion of white balls in the selected urn? ***50%***
(4) Which proportion of white balls do you expect in the selected urn if urn A was selected? ***75%***
(5) Is the following statement true or false: 'Drawn balls are returned directly to the urn.'? *[**true**, false]*
(6) Is the following statement true or false: 'For each question, a new urn is chosen randomly.'? *[**true**, false]*

(7) Which of the following are you asked to estimate? *[probability that a certain urn was selected, proportion of white and black balls in the selected urn]*

(For the multiple choice questions, the available answer options are provided in brackets. The remaining questions were answered by entering numbers in a text box. Bold font marks the correct answers. For question (7) the correct answer depends on the question mode in the respective treatment.)

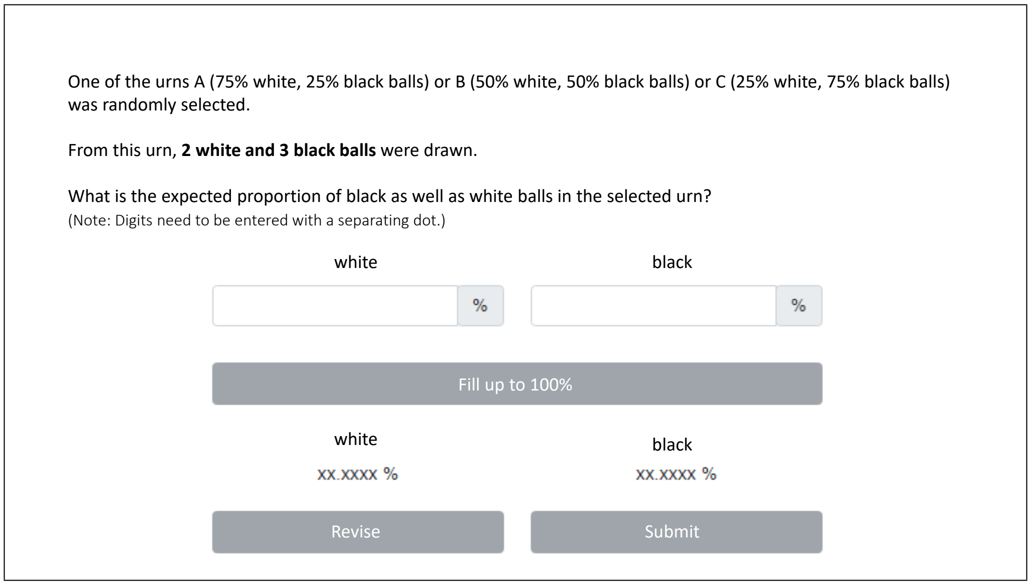
Judgment task screenshots

Figure J.3. Screenshot from T^{dist}_{3urn}-treatment.



(For reasons of brevity we only included a screenshot for one of the 19 signal sets within the respective treatments.)

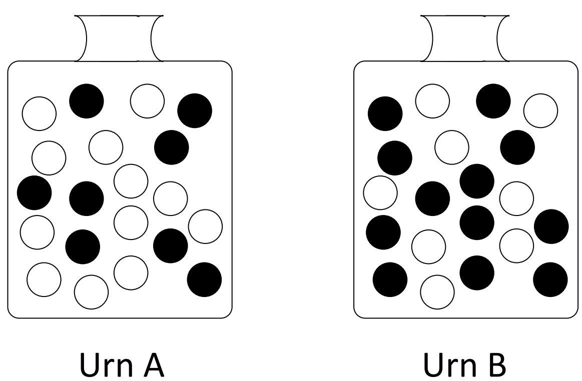
Figure J.4. Screenshot from T_{3urn}^{exp}-treatment.



Griffin and Tversky (1992) setting

General information

In this part of our experiment there are two identical looking urns A and B. The balls in the urns can be either white or black in color. In urn A, 40% of the balls are white and 60% of the balls are black. In urn B, 40% of the balls are white and 60% of the balls are black.



For each question, one of the two urns A or B is randomly selected (each with a probability of 1/2). You will not be told the result of this random selection. Subsequently, balls are drawn from the selected urn one after the other. The number of balls drawn depends on the particular question. Balls that are drawn are put back directly and can be drawn again. You will now be shown the number and colors of the balls drawn.

(The question mode is then described according to the respective treatment. Subsection headings (in italics) were not part of the experimental instructions but are included for reasons of clarity in this overview of experimental instructions.)

Question mode in dist-treatments. Using this information, you are asked to indicate the probability that the urn from which the balls were drawn is urn A or urn B.
Since urn B contains a relatively large number of black balls, the information about how many white and black balls were drawn will help you to indicate the probability that urn B was selected. For example, if a relatively large number of black balls were drawn, it is more likely that urn B was selected. For the next question, another urn is randomly selected again.

Question mode in exp-treatments. Using this information, you are asked to indicate the expected share of white and black balls in the selected urn. Therefore, you need to consider the probability of seeing the selected urn as well as the share of white and black balls in the respective urns. This expected value can be interpreted as the probability of seeing a white or black ball when drawing from the same urn again.
The urns contain a different number of white and black balls. This information helps you to indicate the share of white and black balls in the selected urn. For example, if a relatively large number of black balls were drawn, it is it is more likely that the share of black balls in the selected urn is relatively high. For the next question, another urn is randomly selected again.

Control questions

First, we would like to ask you a few control questions about the experiment to make sure you understood the structure and procedure of the experiment. To answer the questions, you can return to the previous page at any time to read the experiment instructions again. You can only begin answering the actual assessment questions once you have answered the control questions correctly. If you have problems answering the control questions, please contact the experiment director by clicking on "Ask for help" in your zoom window.

(1) How many different urns exist in this part of the experiment? *[1,**2**,3,4]*

(2) If no balls have been drawn from the selected urn yet, what is the probability that the urn is urn A? *[**1/2**,1/3,1/4,1/5]*

(3) If no balls have been drawn from the selected urn yet, what is the expected proportion of white balls in the selected urn? ***50%***

(4) Which proportion of white balls do you expect in the selected urn if urn A was selected? ***60%***

(5) Is the following statement true or false: 'Drawn balls are returned directly to the urn.'? *[**true**, false]*

(6) Is the following statement true or false: 'For each question, a new urn is chosen randomly.'? *[**true**, false]*

(7) Which of the following are you asked to estimate? *[probability that a certain urn was selected, proportion of white and black balls in the selected urn]*

(For the multiple choice questions, the available answer options are provided in brackets. The remaining questions were answered by entering numbers in a text box. Bold font marks the correct answers. For question (7) the correct answer depends on the question mode in the respective treatment.)

Judgment task screenshots

(For reasons of brevity we only included a screenshot for one of the 16 signal sets within the respective treatments.)

Figure J.5. Screenshot from T_{GT}^{dist}-treatment.

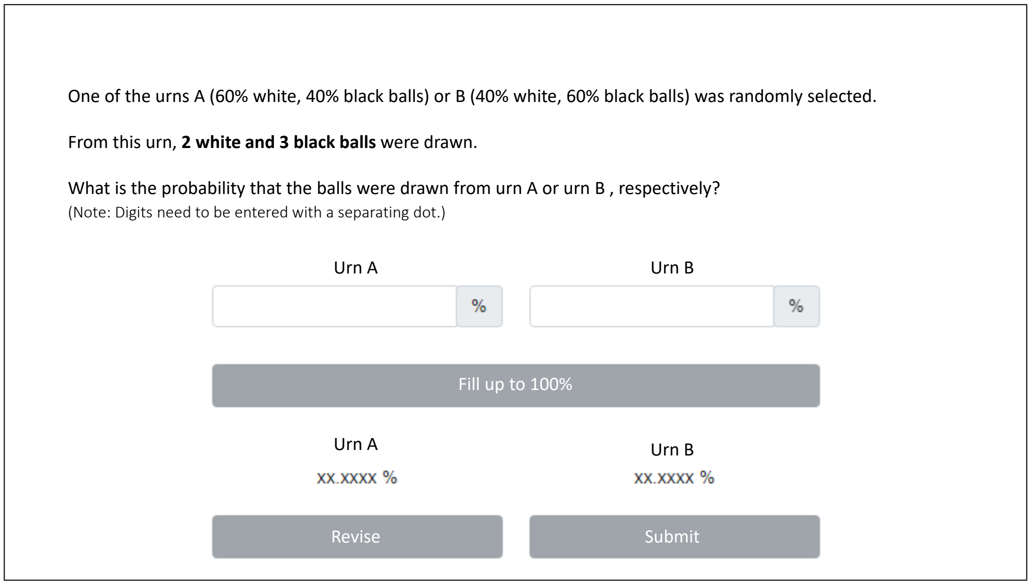
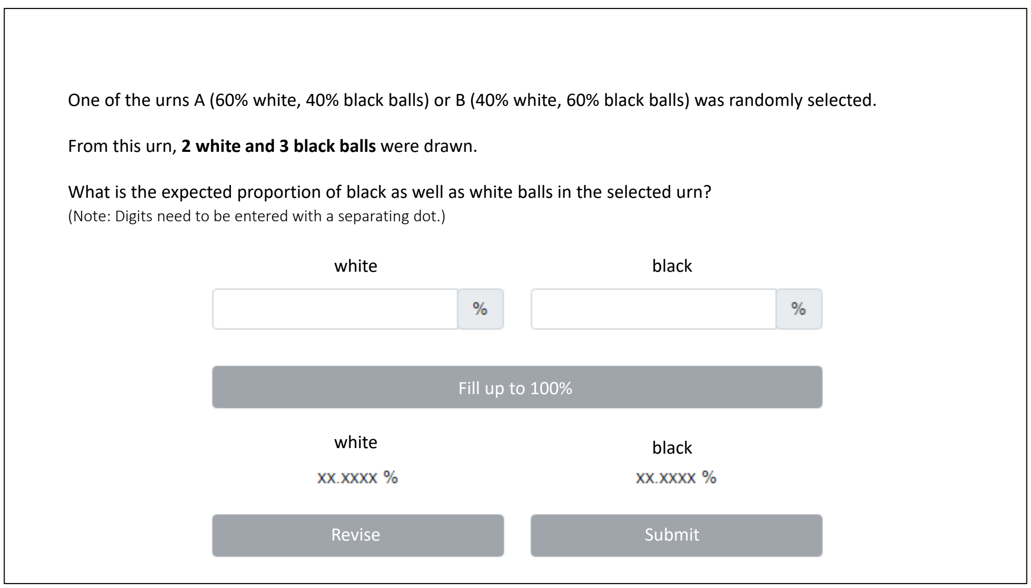


Figure J.6. Screenshot from T_{GT}^{exp}-treatment.



Additional questionnaire

You have now answered all assessment questions of today's experiment.

Please answer the following five questions:

(1) A bat and a ball cost 1.10 euros together. The bat costs 1 euro more than the ball. How much does the ball cost?

(2) If five machines need five minutes to produce five product, how long will it take 100 machines to produce 100 products?

(3) Water lilies grow in a lake. Every day the amount of water lilies doubles. It takes 48 days for the water lilies to cover the entire lake. How long would it take for the water lilies to cover half of the lake?

(4) What do you expect your compensation for today's part of the experiment to be (fixed plus variable)?

(5) How do you think your compensation today compares with that of the other participants of the experiment? *[Less than average, Roughly equal, More than average]*

Finally, we would like to ask you some additional questions to better understand your decision behavior today.

(1) For each of the following aspects, please indicate how strongly you took them into account when answering the assessment questions.
   - Composition of urns
   - Number of balls drawn
   - Difference between numbers of black/white balls drawn
   - Ratio of black and white balls drawn

   (Answers were recorded on a 7-point-Likert scale ranging from "not at all" to "very strongly".)

(2) For the following aspects, please indicate whether you have considered them more strongly in the case of two or three urns.
   - Composition of urns
   - Number of balls drawn
   - Difference between numbers of black/white balls drawn

- Ratio of black and white balls drawn

  (Answers were recorded on a 7-point-Likert scale ranging from "much stronger in case of two urns" to "much stronger in case of three urns".)

(3) Please briefly explain how you came up with probability assessments when 2 white and 3 black balls were drawn from one of **two** possible urns.

(4) Please briefly explain how you came up with probability assessments when 2 white and 3 black balls were drawn from one of **three** possible urns.

(5) Did the answering mechanism "Fillup to 100%" help you to answer the assessment questions? The answering mechanism did... *[7-point-Likert scale ranging from "confuse me" to "help me"]*

(6) Was it easy to use the answering mechanism "Fill up to 100%"? *[7-point-Likert scale ranging from "not at all" to "completely"]*

(7) Assume we had also disclosed the order in which the balls were drawn instead of only the total number of white and black balls. Do you think this would have helped you when making the assessments? *[Yes, No]*

(8) Out of 1000 people in a small town, 500 are members of the singing club. Of these 500 members of the singing club, 100 are men. Of the 500 people who are not in the singing club, 300 are men. What is the probability that a randomly selected man is a member of the singing club?

(9) What do you expect your compensation for today's part of the experiment to be (fixed plus variable)?

(10) How do you think your compensation today compares with that of the other participants of the experiment? *[Less than average, Roughly equal, More than average]*

Compensation

Component 1:

Participation payment 5 EUR

Component 2:

For your compensation from the first part of the experiment, decision situation XX was randomly selected.

Drawing of X white and X black balls; probability of urn A/B/C *or* proportion of white/black balls.
Your answer: XX.XX %
Correct answer: XX.XX %
Resulting compensation: X.XX EUR

For your compensation from the second part of the experiment, decision situation XX was randomly selected.
Drawing of X white and X black balls; probability of urn A/B/C *or* proportion of white/black balls.
Your answer: XX.XX %
Correct answer: XX.XX %
Resulting compensation: X.XX EUR

For your compensation from the third part of the experiment, decision situation XX was randomly selected.
Drawing of X white and X black balls; probability of urn A/B/C *or* proportion of white/black balls.
Your answer: XX.XX %
Correct answer: XX.XX %
Resulting compensation: X.XX EUR

Total compensation: 5 + X.XX + X.XX + X.XX = XX.XX EUR
You will receive your compensation after successfully finishing both parts of the experiment.
Your total compensation amounts to XX.XX EUR (XX.XX EUR from the first part of the experiment and XX.XX EUR from today's part of the experiment). Please provide details for your disbursement below. Please note that we will only use this payment information for the purpose of your payout and will delete it accordingly after the payout has been made. We also guarantee strict separation of this personal information from the data collected during the experiment.
Please select your preferred payment method:

- Paypal
- Bank transfer

Concluding information

Please answer the following questions about your person:

(1) Please indicate your gender.
   - Female
   - Male
   - Diverse

(2) Please indicate your age.

(3) Please indicate your highest level of education.
   - High school degree
   - Bachelor's degree
   - Master's degree
   - PhD

(4) Please indicate your course of study.
   - Business Administration
   - Economics
   - Business Informatics
   - Other: *[Please indicate]*

(5) Did you visit the lecture "Statistics II" during your studies?
   - Yes
   - No

Thank you for your participation in this experiment! Your compensation for this part of the experiment was saved. The amount will be paid out along with the compensation for the second part after you have taken part in both parts of the experiments.

If you have any suggestions or comments regarding the experiment, feel free to write them down in the box below.

Thank you for participating in our experiment!

K. Subject-Level State Probabilities Ratios

Figure K.1. Subject-Level State Probability Ratios for Signal Set $S_{0,1}$.
Note. For each subject i, this figure shows the state probability ratios x_{Si} and m_{Si} for signal set $S_{0,1}$ in treatments T^{dist}_{2urn} (Panel A) and T^{dist}_{3urn} (Panel B). After observing 0 white and 1 black ball, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T^{dist}_{2urn} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T^{dist}_{3urn}. Based on these stated probabilities, we calculate the probability ratios $x_{Si} = P_{Si}(B)/(P_{Si}(A) + P_{Si}(B))$ and $m_{Si} = P_{Si}(M)/(P_{Si}(A) + P_{Si}(B))$. These subject-level ratios are reflected by the blue dots while the red triangle corresponds to the Bayesian benchmark. The yellow and green lines show all state probability combinations that imply the Bayesian level of x_S and m_S, respectively. The red line in Panel B shows all combinations of state probability ratios that correspond to p^*_S, the Bayesian expected proportion of black balls in the selected urn. In the two-state case (Panel A), the red triangle reflects the only feasible combination that yields p^*_S.

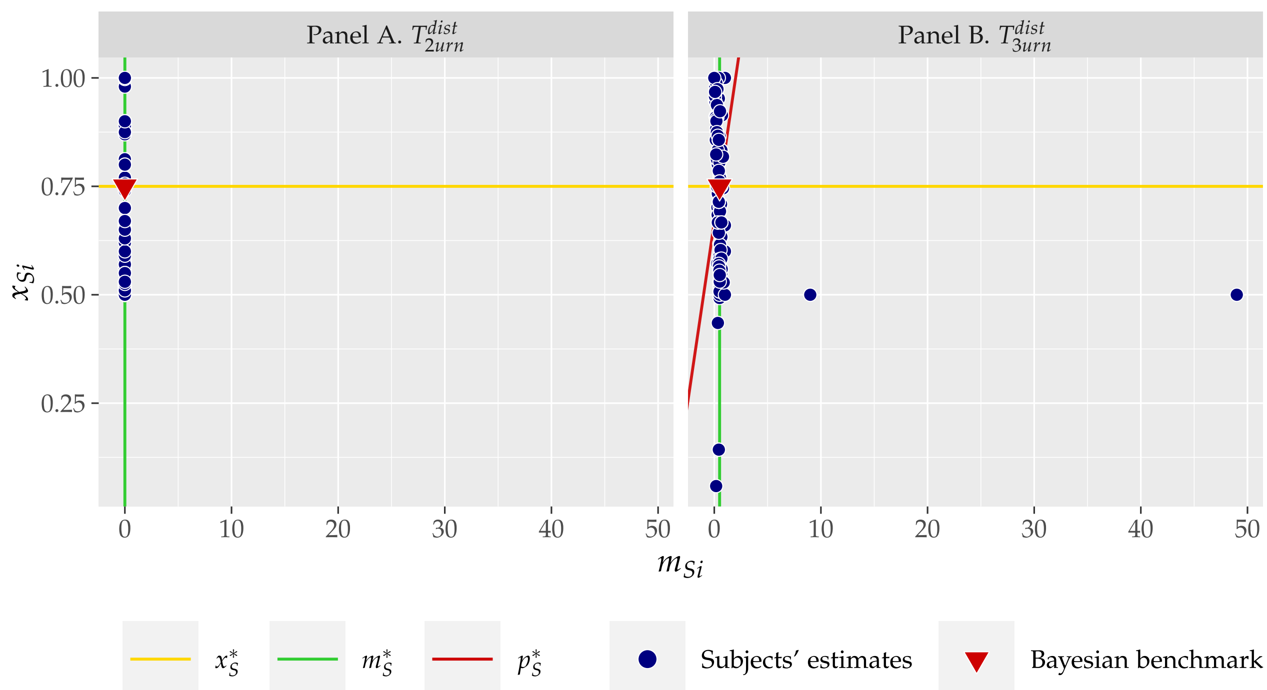


Figure K.2. Subject-Level State Probability Ratios for Signal Set $S_{1,2}$.
Note. For each subject i, this figure shows the state probability ratios x_{Si} and m_{Si} for signal set $S_{1,2}$ in treatments T^{dist}_{2urn} (Panel A) and T^{dist}_{3urn} (Panel B). After observing 1 white and 2 black balls, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T^{dist}_{2urn} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T^{dist}_{3urn}. Based on these stated probabilities, we calculate the probability ratios $x_{Si} = P_{Si}(B)/(P_{Si}(A) + P_{Si}(B))$ and $m_{Si} = P_{Si}(M)/(P_{Si}(A) + P_{Si}(B))$. These subject-level ratios are reflected by the blue dots while the red triangle corresponds to the Bayesian benchmark. The yellow and green lines show all state probability combinations that imply the Bayesian level of x_S and m_S, respectively. The red line in Panel B shows all combinations of state probability ratios that correspond to p^*_S, the Bayesian expected proportion of black balls in the selected urn. In the two-state case (Panel A), the red triangle reflects the only feasible combination that yields p^*_S.

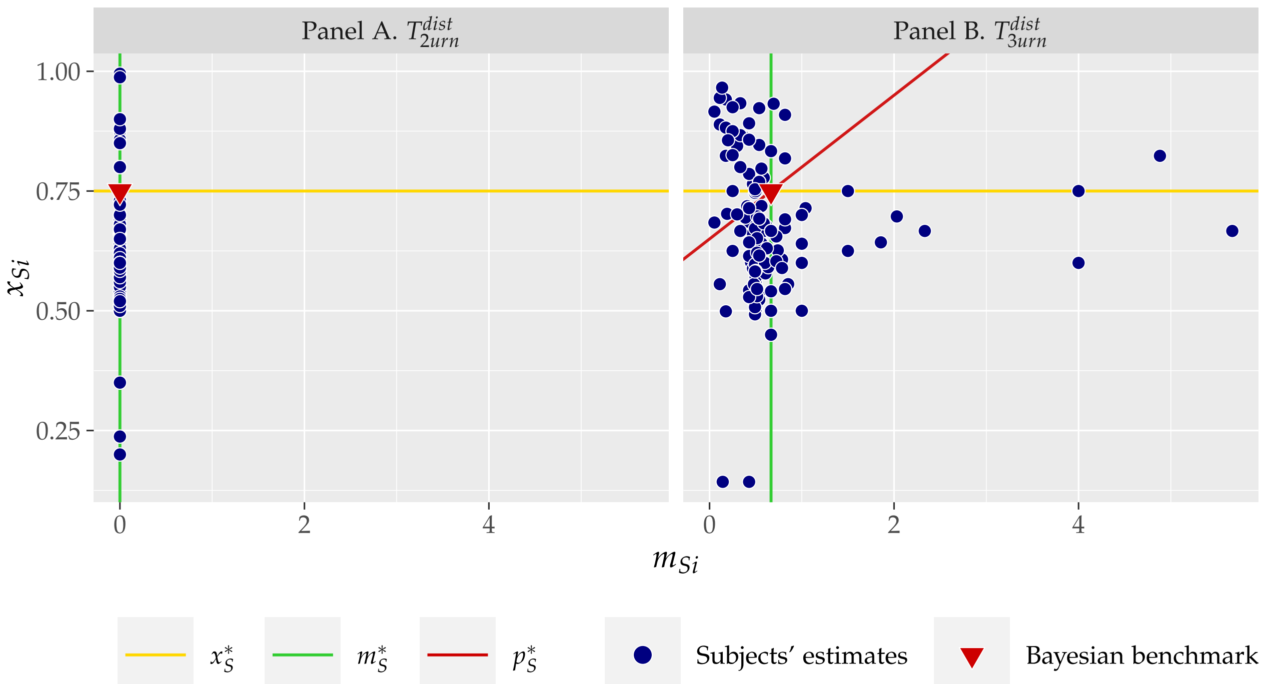


Figure K.3. Subject-Level State Probability Ratios for Signal Set $S_{0,3}$.
Note. For each subject i, this figure shows the state probability ratios x_{Si} and m_{Si} for signal set $S_{0,3}$ in treatments T^{dist}_{2urn} (Panel A) and T^{dist}_{3urn} (Panel B). After observing 0 white and 3 black balls, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T^{dist}_{2urn} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T^{dist}_{3urn}. Based on these stated probabilities, we calculate the probability ratios $x_{Si} = P_{Si}(B)/(P_{Si}(A) + P_{Si}(B))$ and $m_{Si} = P_{Si}(M)/(P_{Si}(A) + P_{Si}(B))$. These subject-level ratios are reflected by the blue dots while the red triangle corresponds to the Bayesian benchmark. The yellow and green lines show all state probability combinations that imply the Bayesian level of x_S and m_S, respectively. The red line in Panel B shows all combinations of state probability ratios that correspond to p^*_S, the Bayesian expected proportion of black balls in the selected urn. In the two-state case (Panel A), the red triangle reflects the only feasible combination that yields p^*_S.

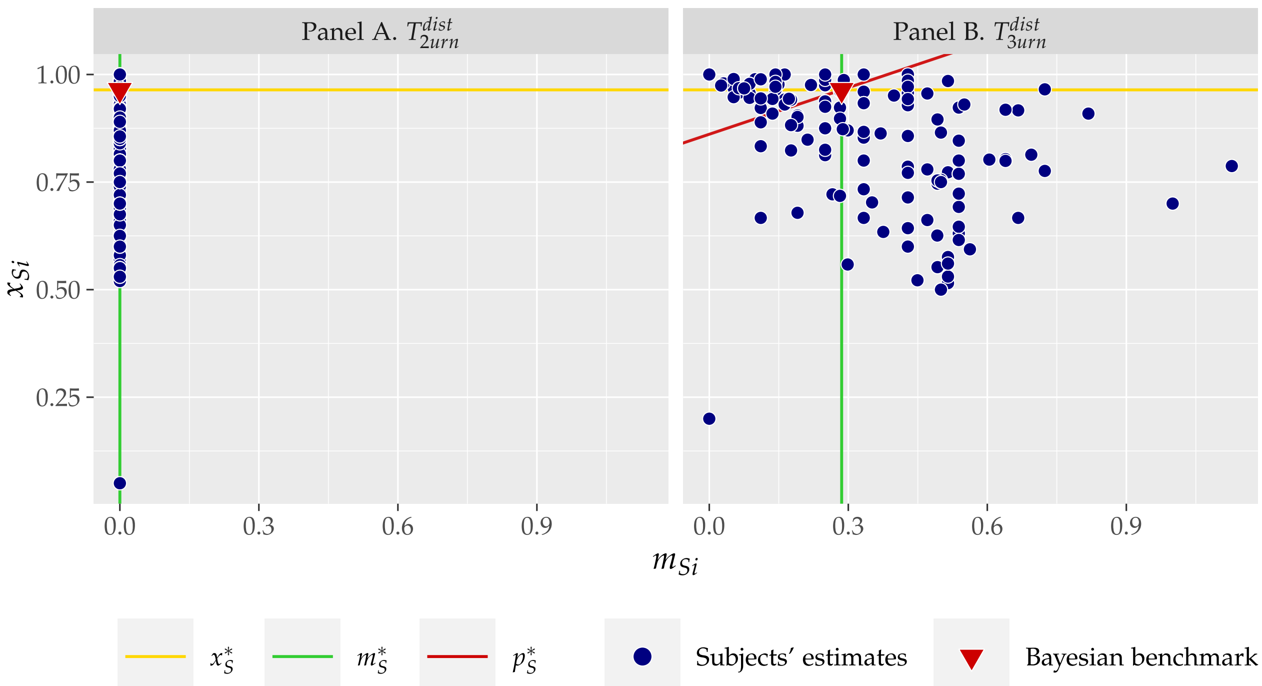


Figure K.4. Subject-Level State Probability Ratios for Signal Set $S_{2,3}$.

Note. For each subject i, this figure shows the state probability ratios x_{Si} and m_{Si} for signal set $S_{2,3}$ in treatments T^{dist}_{2urn} (Panel A) and T^{dist}_{3urn} (Panel B). After observing 2 white and 3 black balls, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T^{dist}_{2urn} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T^{dist}_{3urn}. Based on these stated probabilities, we calculate the probability ratios $x_{Si} = P_{Si}(B)/(P_{Si}(A) + P_{Si}(B))$ and $m_{Si} = P_{Si}(M)/(P_{Si}(A) + P_{Si}(B))$. These subject-level ratios are reflected by the blue dots while the red triangle corresponds to the Bayesian benchmark. The yellow and green lines show all state probability combinations that imply the Bayesian level of x_S and m_S, respectively. The red line in Panel B shows all combinations of state probability ratios that correspond to p^*_S, the Bayesian expected proportion of black balls in the selected urn. In the two-state case (Panel A), the red triangle reflects the only feasible combination that yields p^*_S.

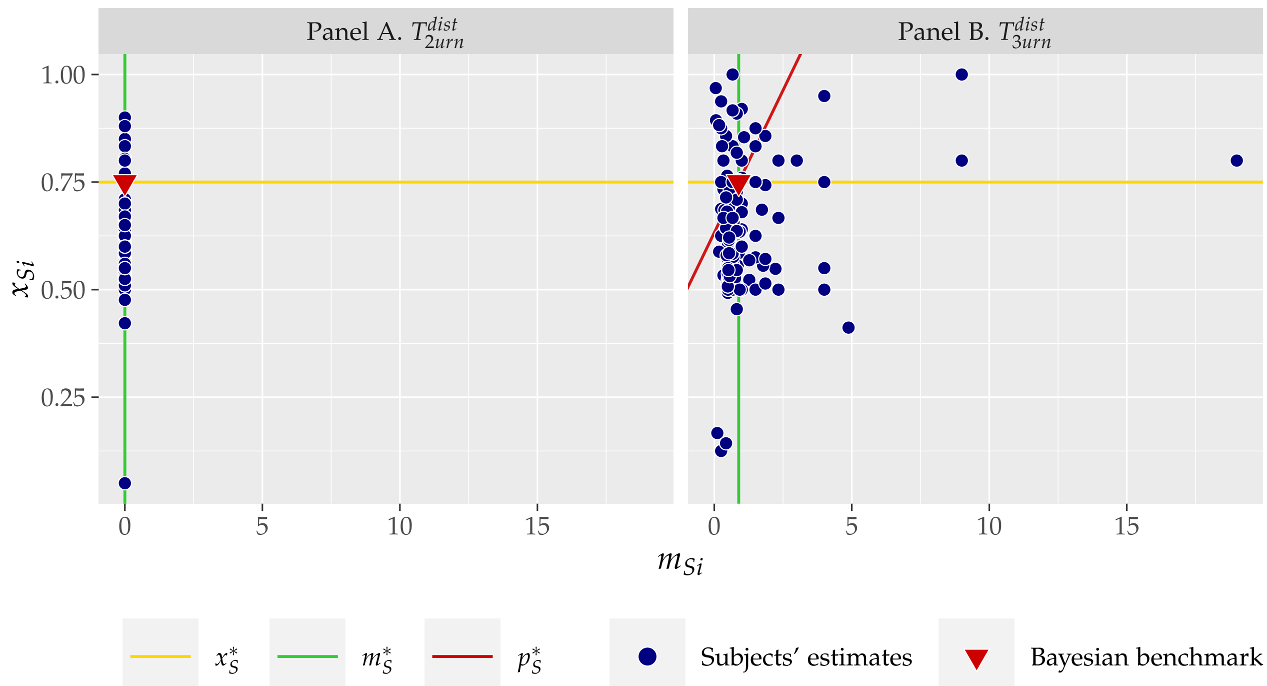


Figure K.5. Subject-Level State Probability Ratios for Signal Set $S_{1,4}$.
Note. For each subject i, this figure shows the state probability ratios x_{Si} and m_{Si} for signal set $S_{1,4}$ in treatments T^{dist}_{2urn} (Panel A) and T^{dist}_{3urn} (Panel B). After observing 1 white and 4 black balls, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T^{dist}_{2urn} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T^{dist}_{3urn}. Based on these stated probabilities, we calculate the probability ratios $x_{Si} = P_{Si}(B)/(P_{Si}(A) + P_{Si}(B))$ and $m_{Si} = P_{Si}(M)/(P_{Si}(A) + P_{Si}(B))$. These subject-level ratios are reflected by the blue dots while the red triangle corresponds to the Bayesian benchmark. The yellow and green lines show all state probability combinations that imply the Bayesian level of x_S and m_S, respectively. The red line in Panel B shows all combinations of state probability ratios that correspond to p^*_S, the Bayesian expected proportion of black balls in the selected urn. In the two-state case (Panel A), the red triangle reflects the only feasible combination that yields p^*_S.

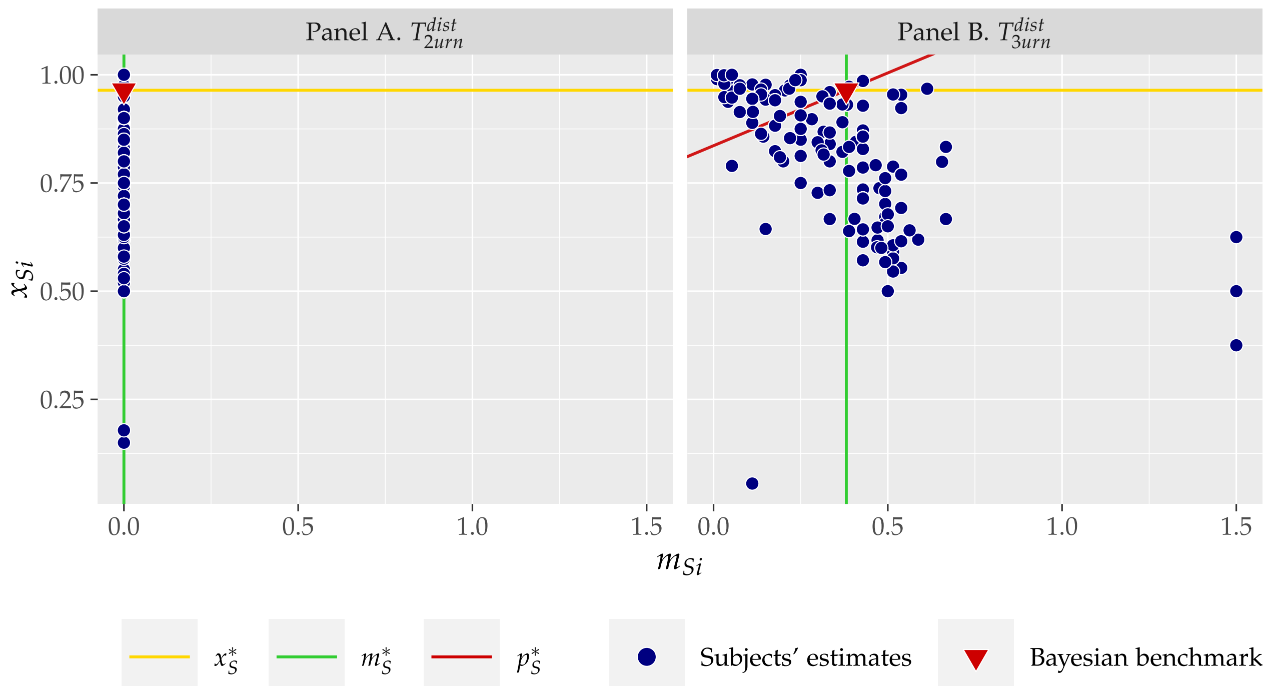


Figure K.6. Subject-Level State Probability Ratios for Signal Set $S_{0,5}$.

Note. For each subject i, this figure shows the state probability ratios x_{Si} and m_{Si} for signal set $S_{0,5}$ in treatments T^{dist}_{2urn} (Panel A) and T^{dist}_{3urn} (Panel B). After observing 0 white and 5 black balls, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T^{dist}_{2urn} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T^{dist}_{3urn}. Based on these stated probabilities, we calculate the probability ratios $x_{Si} = P_{Si}(B)/(P_{Si}(A) + P_{Si}(B))$ and $m_{Si} = P_{Si}(M)/(P_{Si}(A) + P_{Si}(B))$. These subject-level ratios are reflected by the blue dots while the red triangle corresponds to the Bayesian benchmark. The yellow and green lines show all state probability combinations that imply the Bayesian level of x_S and m_S, respectively. The red line in Panel B shows all combinations of state probability ratios that correspond to p^*_S, the Bayesian expected proportion of black balls in the selected urn. In the two-state case (Panel A), the red triangle reflects the only feasible combination that yields p^*_S.

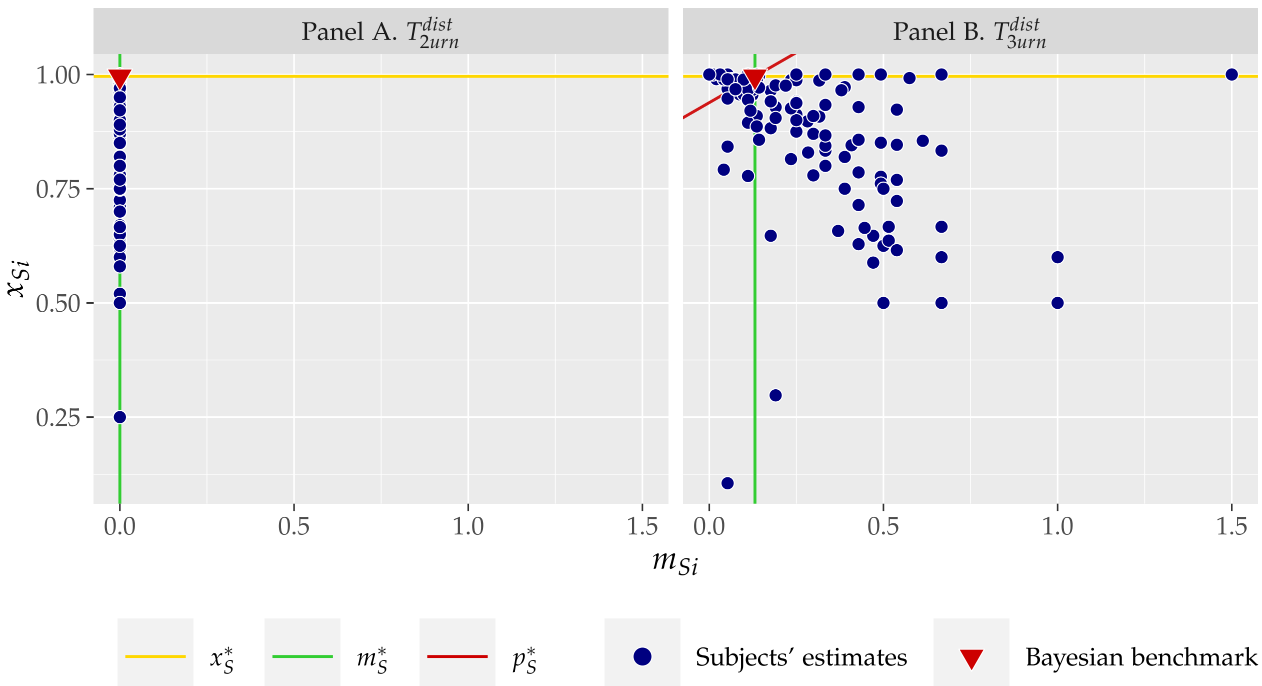


Figure K.7. Subject-Level State Probability Ratios for Signal Set $S_{4,5}$.

Note. For each subject i, this figure shows the state probability ratios x_{Si} and m_{Si} for signal set $S_{4,5}$ in treatments T^{dist}_{2urn} (Panel A) and T^{dist}_{3urn} (Panel B). After observing 4 white and 5 black balls, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T^{dist}_{2urn} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T^{dist}_{3urn}. Based on these stated probabilities, we calculate the probability ratios $x_{Si} = P_{Si}(B)/(P_{Si}(A) + P_{Si}(B))$ and $m_{Si} = P_{Si}(M)/(P_{Si}(A) + P_{Si}(B))$. These subject-level ratios are reflected by the blue dots while the red triangle corresponds to the Bayesian benchmark. The yellow and green lines show all state probability combinations that imply the Bayesian level of x_S and m_S, respectively. The red line in Panel B shows all combinations of state probability ratios that correspond to p^*_S, the Bayesian expected proportion of black balls in the selected urn. In the two-state case (Panel A), the red triangle reflects the only feasible combination that yields p^*_S.

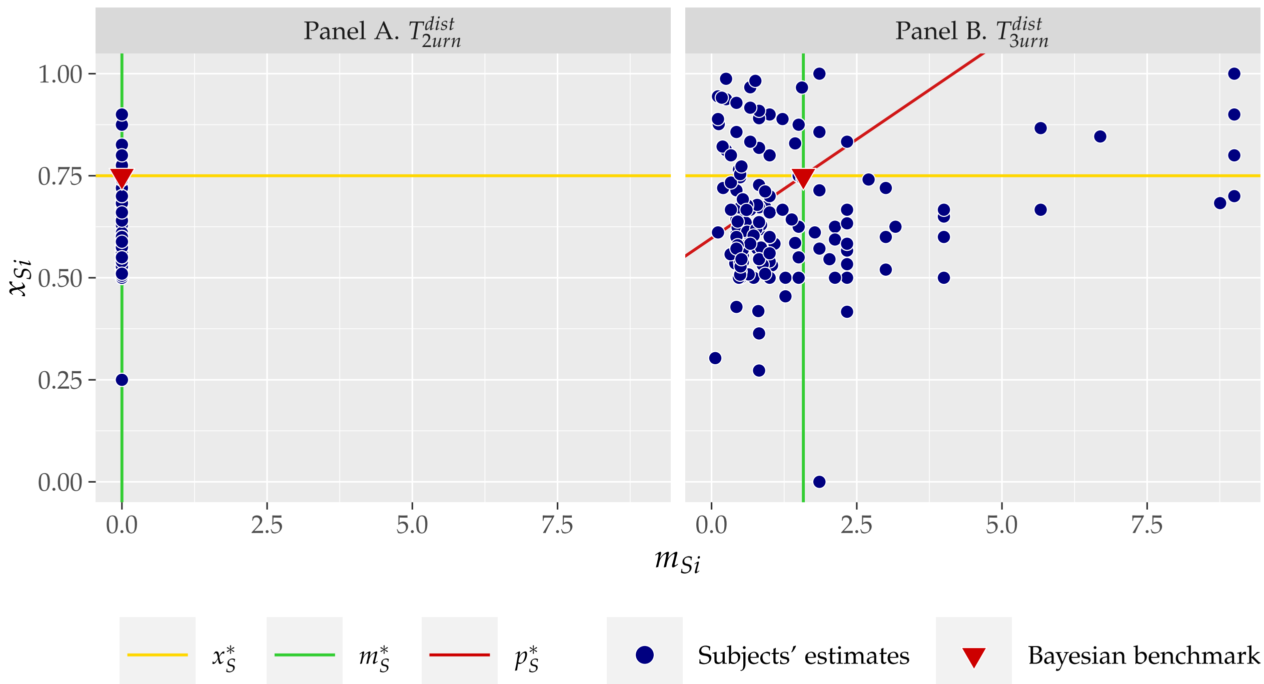


Figure K.8. Subject-Level State Probability Ratios for Signal Set $S_{3,6}$.

Note. For each subject i, this figure shows the state probability ratios x_{Si} and m_{Si} for signal set $S_{3,6}$ in treatments T^{dist}_{2urn} (Panel A) and T^{dist}_{3urn} (Panel B). After observing 3 white and 6 black balls, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T^{dist}_{2urn} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T^{dist}_{3urn}. Based on these stated probabilities, we calculate the probability ratios $x_{Si} = P_{Si}(B)/(P_{Si}(A) + P_{Si}(B))$ and $m_{Si} = P_{Si}(M)/(P_{Si}(A) + P_{Si}(B))$. These subject-level ratios are reflected by the blue dots while the red triangle corresponds to the Bayesian benchmark. The yellow and green lines show all state probability combinations that imply the Bayesian level of x_S and m_S, respectively. The red line in Panel B shows all combinations of state probability ratios that correspond to p^*_S, the Bayesian expected proportion of black balls in the selected urn. In the two-state case (Panel A), the red triangle reflects the only feasible combination that yields p^*_S.

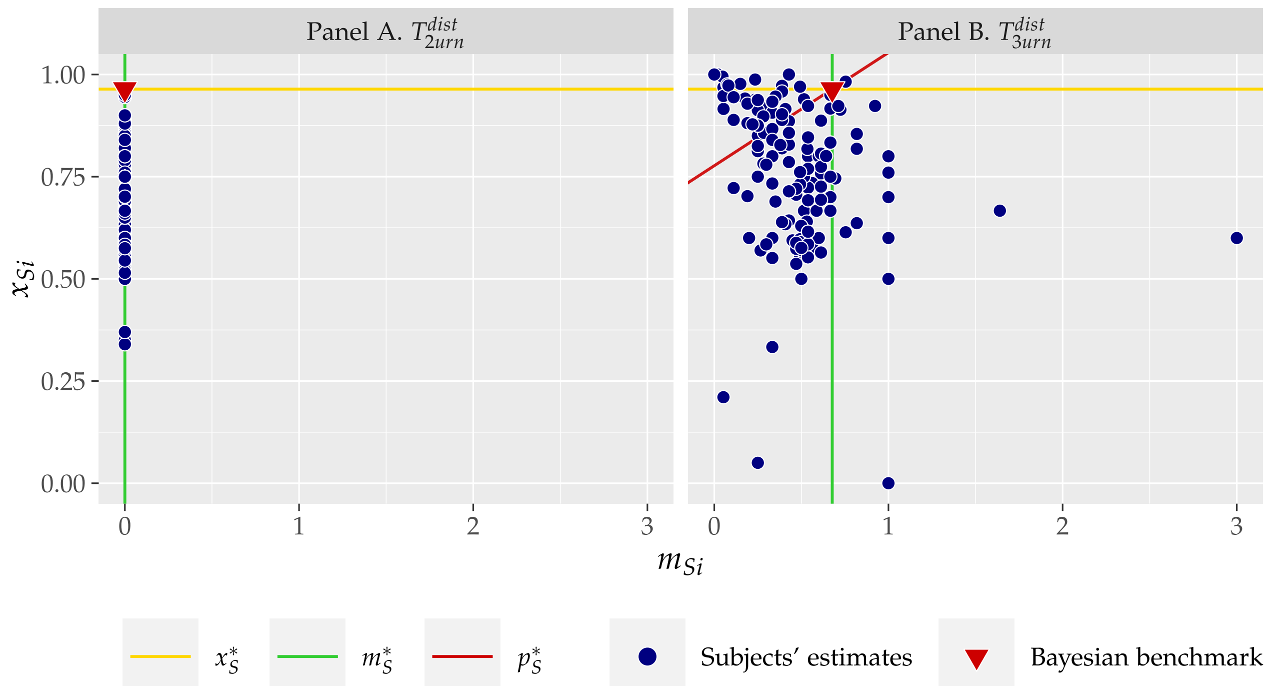


Figure K.9. Subject-Level State Probability Ratios for Signal Set $S_{2,7}$.
Note. For each subject i, this figure shows the state probability ratios x_{Si} and m_{Si} for signal set $S_{2,7}$ in treatments T^{dist}_{2urn} (Panel A) and T^{dist}_{3urn} (Panel B). After observing 2 white and 7 black balls, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T^{dist}_{2urn} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T^{dist}_{3urn}. Based on these stated probabilities, we calculate the probability ratios $x_{Si} = P_{Si}(B)/(P_{Si}(A) + P_{Si}(B))$ and $m_{Si} = P_{Si}(M)/(P_{Si}(A) + P_{Si}(B))$. These subject-level ratios are reflected by the blue dots while the red triangle corresponds to the Bayesian benchmark. The yellow and green lines show all state probability combinations that imply the Bayesian level of x_S and m_S, respectively. The red line in Panel B shows all combinations of state probability ratios that correspond to p^*_S, the Bayesian expected proportion of black balls in the selected urn. In the two-state case (Panel A), the red triangle reflects the only feasible combination that yields p^*_S.

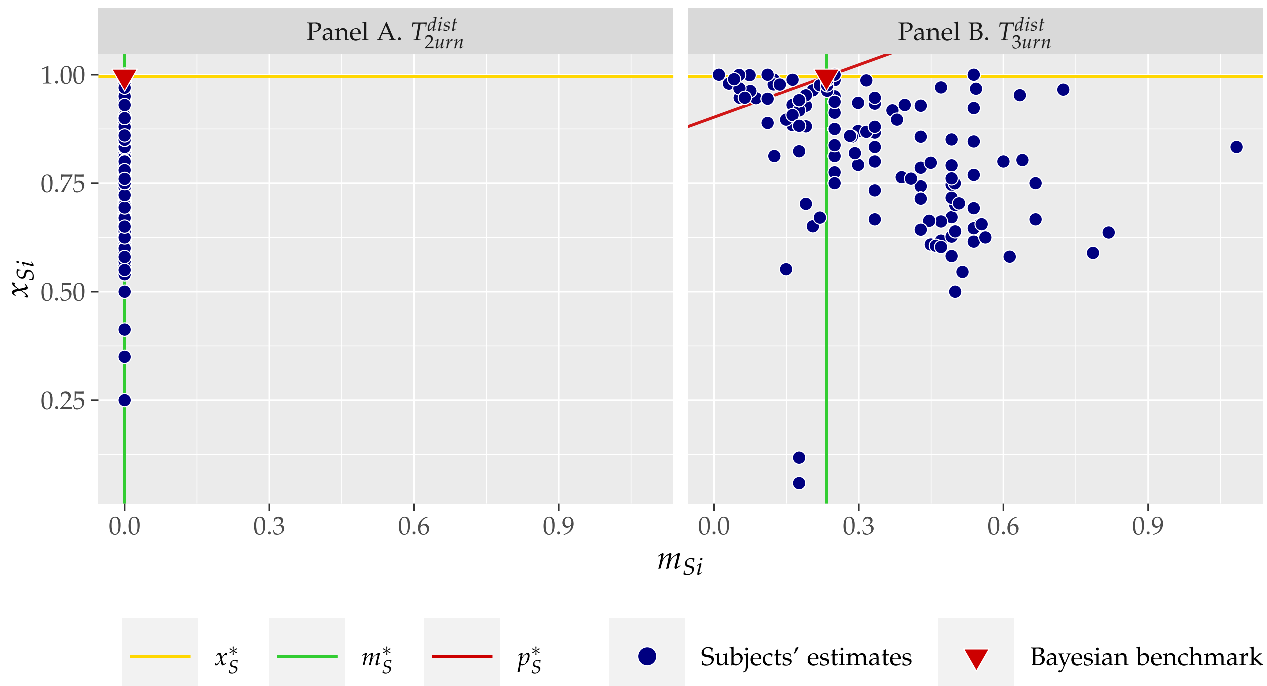


Figure K.10. Subject-Level State Probability Ratios for Signal Set $S_{8,9}$.
Note. For each subject i, this figure shows the state probability ratios x_{Si} and m_{Si} for signal set $S_{8,9}$ in treatments T^{dist}_{2urn} (Panel A) and T^{dist}_{3urn} (Panel B). After observing 8 white and 9 black balls, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T^{dist}_{2urn} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T^{dist}_{3urn}. Based on these stated probabilities, we calculate the probability ratios $x_{Si} = P_{Si}(B)/(P_{Si}(A) + P_{Si}(B))$ and $m_{Si} = P_{Si}(M)/(P_{Si}(A) + P_{Si}(B))$. These subject-level ratios are reflected by the blue dots while the red triangle corresponds to the Bayesian benchmark. The yellow and green lines show all state probability combinations that imply the Bayesian level of x_S and m_S, respectively. The red line in Panel B shows all combinations of state probability ratios that correspond to p^*_S, the Bayesian expected proportion of black balls in the selected urn. In the two-state case (Panel A), the red triangle reflects the only feasible combination that yields p^*_S.

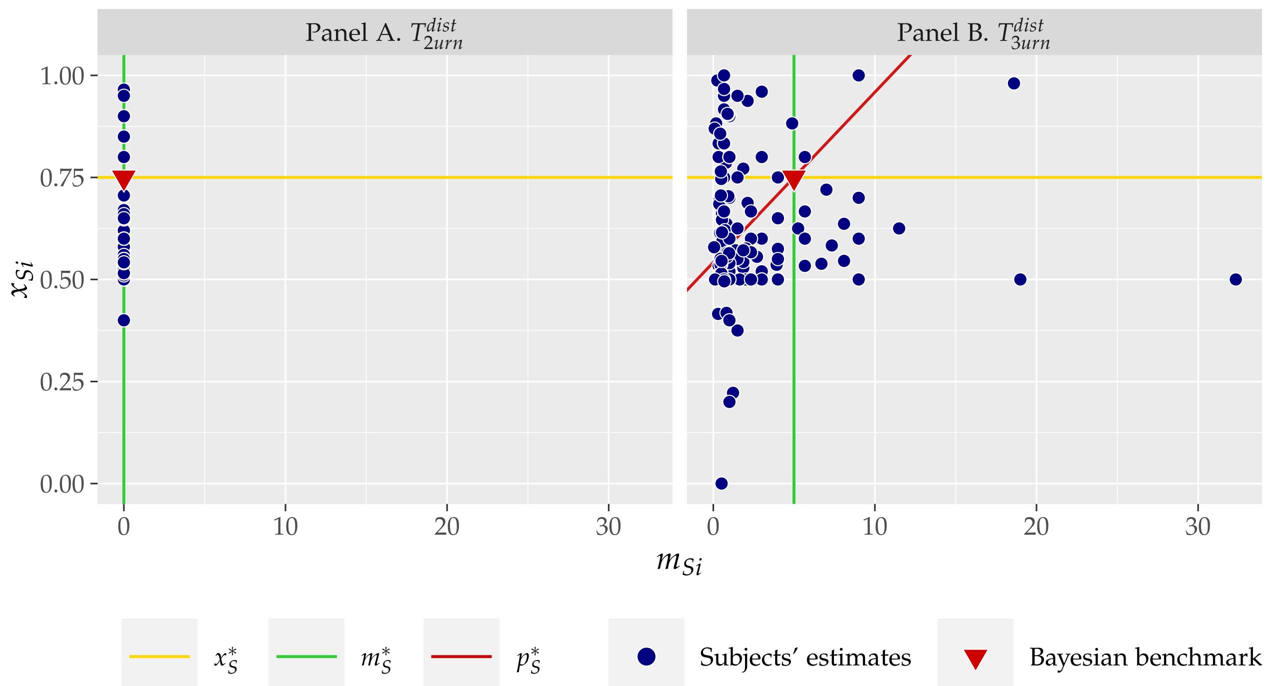


Figure K.11. Subject-Level State Probability Ratios for Signal Set $S_{6,11}$.
Note. For each subject i, this figure shows the state probability ratios x_{Si} and m_{Si} for signal set $S_{6,11}$ in treatments T^{dist}_{2urn} (Panel A) and T^{dist}_{3urn} (Panel B). After observing 6 white and 11 black balls, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T^{dist}_{2urn} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T^{dist}_{3urn}. Based on these stated probabilities, we calculate the probability ratios $x_{Si} = P_{Si}(B)/(P_{Si}(A) + P_{Si}(B))$ and $m_{Si} = P_{Si}(M)/(P_{Si}(A) + P_{Si}(B))$. These subject-level ratios are reflected by the blue dots while the red triangle corresponds to the Bayesian benchmark. The yellow and green lines show all state probability combinations that imply the Bayesian level of x_S and m_S, respectively. The red line in Panel B shows all combinations of state probability ratios that correspond to p^*_S, the Bayesian expected proportion of black balls in the selected urn. In the two-state case (Panel A), the red triangle reflects the only feasible combination that yields p^*_S.

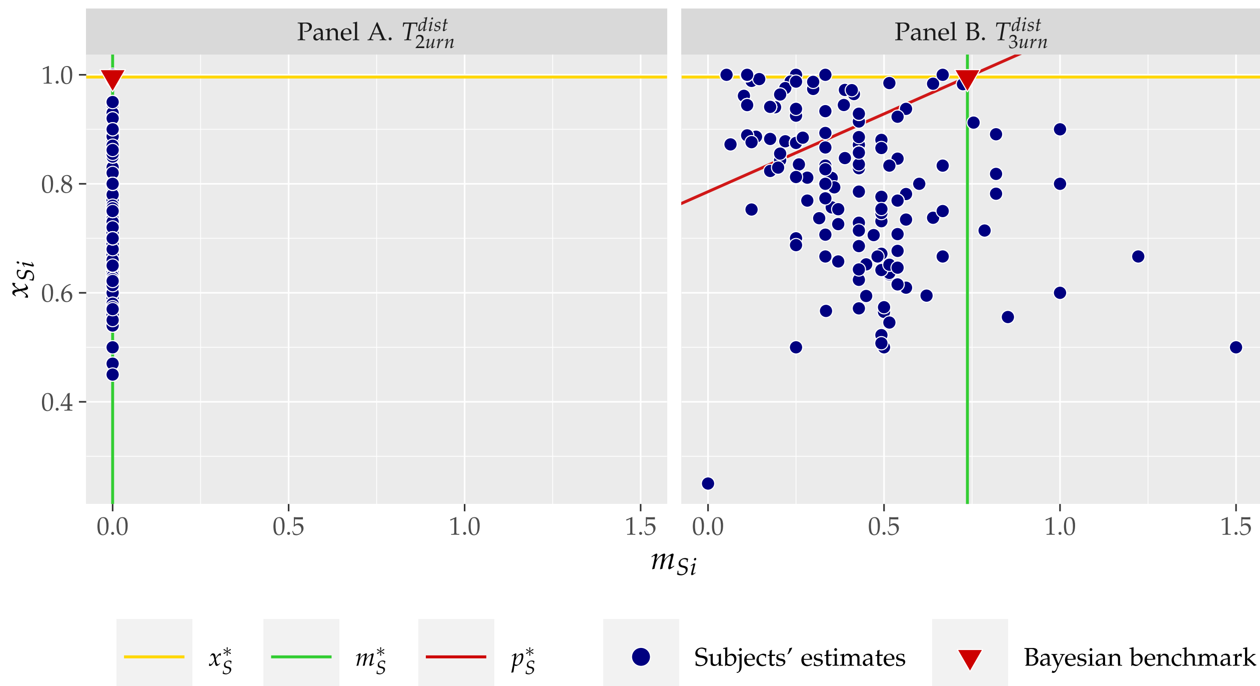


Figure K.12. Subject-Level State Probability Ratios for Signal Set $S_{12,13}$.
Note. For each subject i, this figure shows the state probability ratios x_{Si} and m_{Si} for signal set $S_{12,13}$ in treatments T^{dist}_{2urn} (Panel A) and T^{dist}_{3urn} (Panel B). After observing 12 white and 13 black balls, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T^{dist}_{2urn} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T^{dist}_{3urn}. Based on these stated probabilities, we calculate the probability ratios $x_{Si} = P_{Si}(B)/(P_{Si}(A) + P_{Si}(B))$ and $m_{Si} = P_{Si}(M)/(P_{Si}(A) + P_{Si}(B))$. These subject-level ratios are reflected by the blue dots while the red triangle corresponds to the Bayesian benchmark. The yellow and green lines show all state probability combinations that imply the Bayesian level of x_S and m_S, respectively. The red line in Panel B shows all combinations of state probability ratios that correspond to p^*_S, the Bayesian expected proportion of black balls in the selected urn. In the two-state case (Panel A), the red triangle reflects the only feasible combination that yields p^*_S.

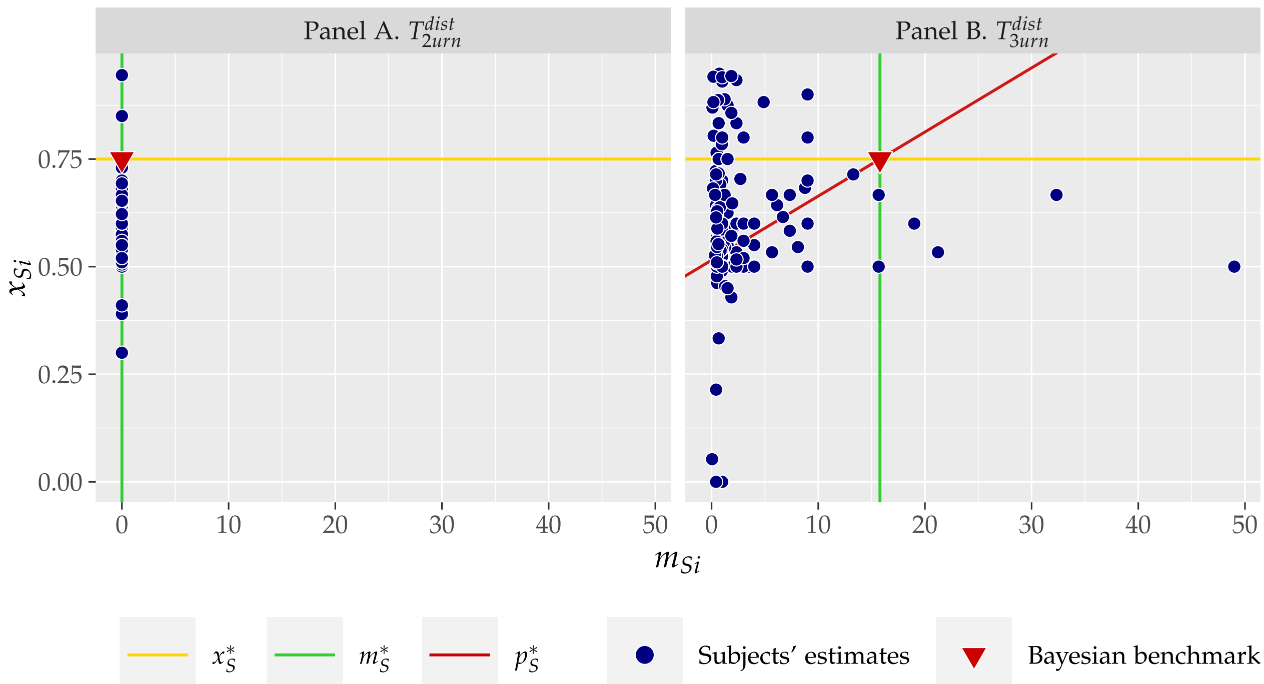


Figure K.13. Subject-Level State Probability Ratios for Signal Set $S_{11,14}$.
Note. For each subject i, this figure shows the state probability ratios x_{Si} and m_{Si} for signal set $S_{11,14}$ in treatments T^{dist}_{2urn} (Panel A) and T^{dist}_{3urn} (Panel B). After observing 11 white and 14 black balls, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T^{dist}_{2urn} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T^{dist}_{3urn}. Based on these stated probabilities, we calculate the probability ratios $x_{Si} = P_{Si}(B)/(P_{Si}(A) + P_{Si}(B))$ and $m_{Si} = P_{Si}(M)/(P_{Si}(A) + P_{Si}(B))$. These subject-level ratios are reflected by the blue dots while the red triangle corresponds to the Bayesian benchmark. The yellow and green lines show all state probability combinations that imply the Bayesian level of x_S and m_S, respectively. The red line in Panel B shows all combinations of state probability ratios that correspond to p^*_S, the Bayesian expected proportion of black balls in the selected urn. In the two-state case (Panel A), the red triangle reflects the only feasible combination that yields p^*_S.

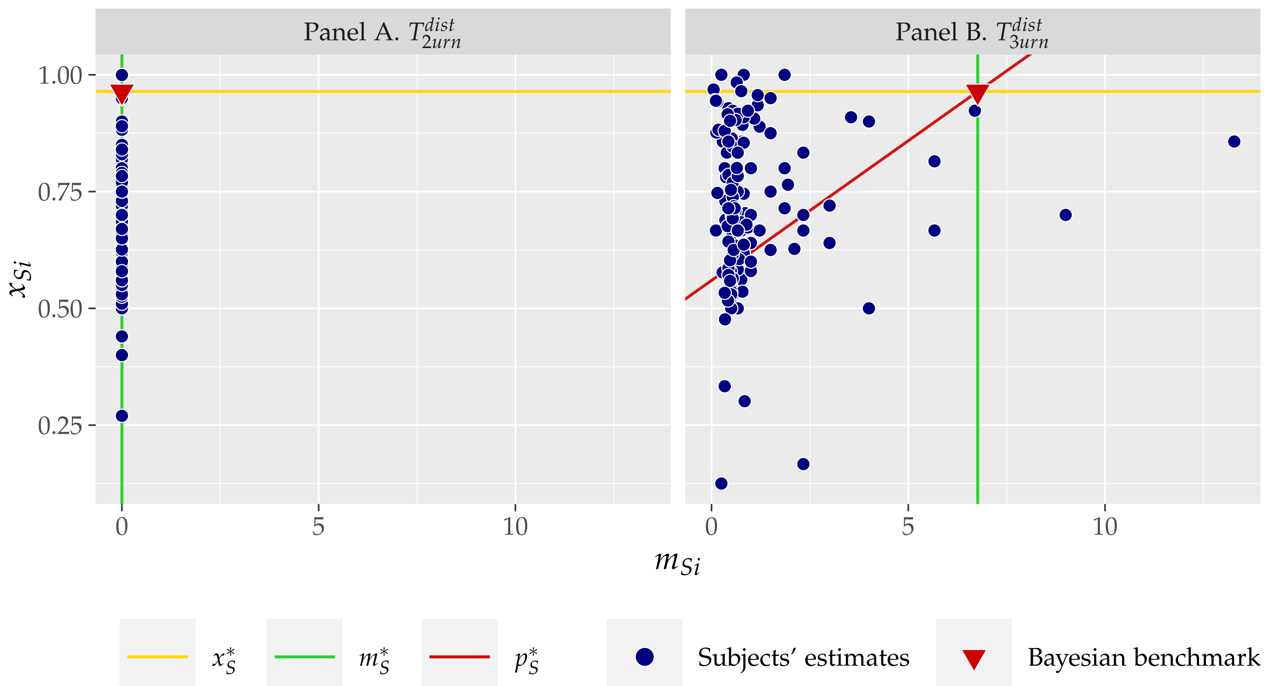


Figure K.14. Subject-Level State Probability Ratios for Signal Set $S_{10,15}$.
Note. For each subject i, this figure shows the state probability ratios x_{Si} and m_{Si} for signal set $S_{10,15}$ in treatments T^{dist}_{2urn} (Panel A) and T^{dist}_{3urn} (Panel B). After observing 10 white and 15 black balls, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T^{dist}_{2urn} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T^{dist}_{3urn}. Based on these stated probabilities, we calculate the probability ratios $x_{Si} = P_{Si}(B)/(P_{Si}(A) + P_{Si}(B))$ and $m_{Si} = P_{Si}(M)/(P_{Si}(A) + P_{Si}(B))$. These subject-level ratios are reflected by the blue dots while the red triangle corresponds to the Bayesian benchmark. The yellow and green lines show all state probability combinations that imply the Bayesian level of x_S and m_S, respectively. The red line in Panel B shows all combinations of state probability ratios that correspond to p^*_S, the Bayesian expected proportion of black balls in the selected urn. In the two-state case (Panel A), the red triangle reflects the only feasible combination that yields p^*_S.

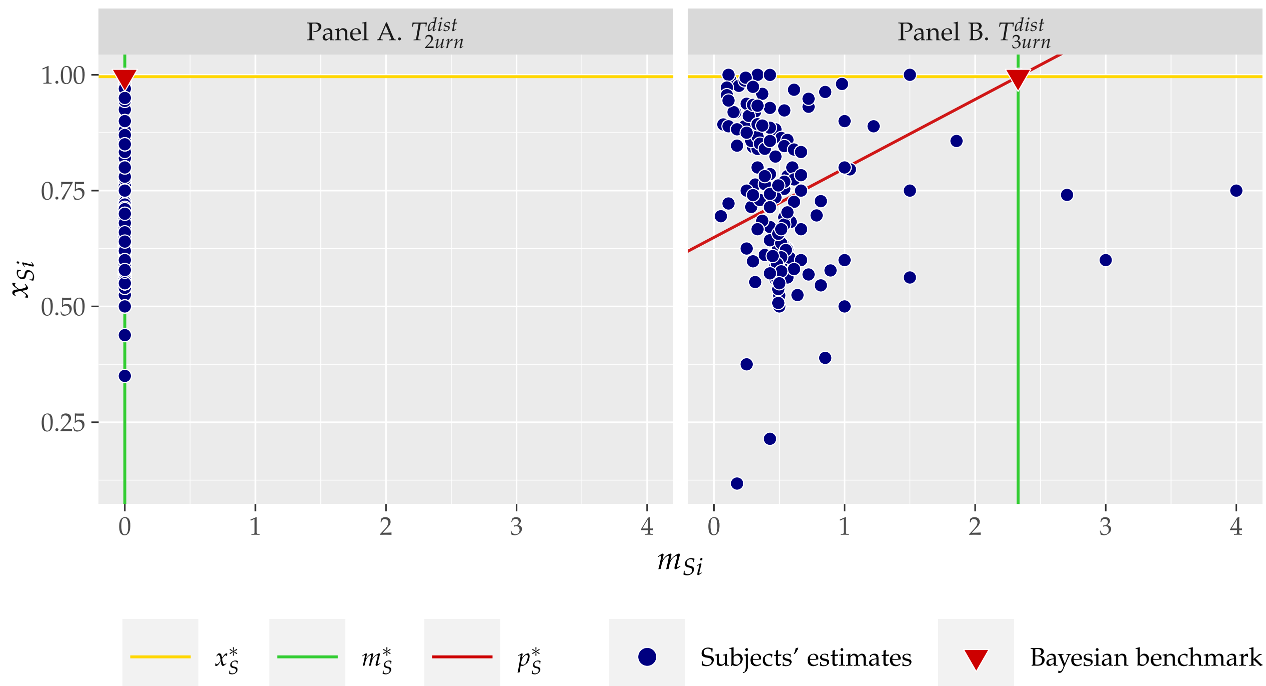
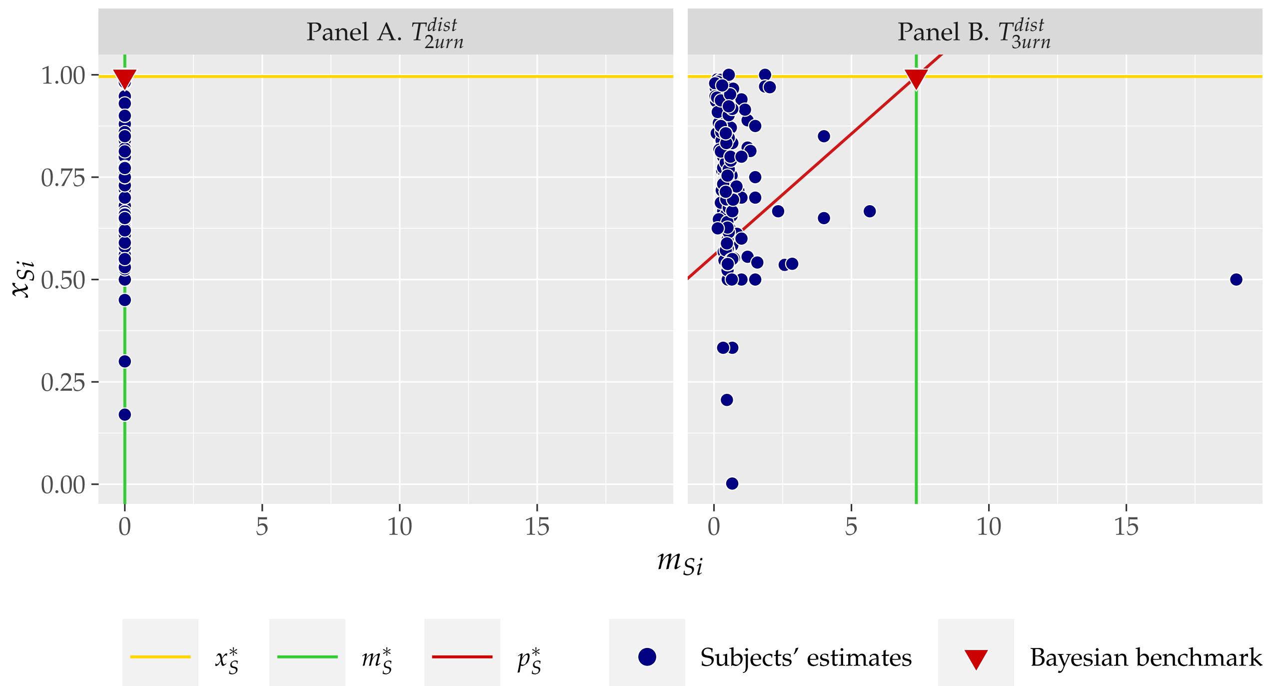


Figure K.15. Subject-Level State Probability Ratios for Signal Set $S_{14,19}$.
Note. For each subject i, this figure shows the state probability ratios x_{Si} and m_{Si} for signal set $S_{14,19}$ in treatments T^{dist}_{2urn} (Panel A) and T^{dist}_{3urn} (Panel B). After observing 14 white and 19 black balls, each subject i provided the state probabilities for state A ($P_{Si}(A)$) and state B ($P_{Si}(B)$) in T^{dist}_{2urn} and for state A ($P_{Si}(A)$), medium-state M ($P_{Si}(M)$), and state B ($P_{Si}(B)$) in T^{dist}_{3urn}. Based on these stated probabilities, we calculate the probability ratios $x_{Si} = P_{Si}(B)/(P_{Si}(A) + P_{Si}(B))$ and $m_{Si} = P_{Si}(M)/(P_{Si}(A) + P_{Si}(B))$. These subject-level ratios are reflected by the blue dots while the red triangle corresponds to the Bayesian benchmark. The yellow and green lines show all state probability combinations that imply the Bayesian level of x_S and m_S, respectively. The red line in Panel B shows all combinations of state probability ratios that correspond to p^*_S, the Bayesian expected proportion of black balls in the selected urn. In the two-state case (Panel A), the red triangle reflects the only feasible combination that yields p^*_S.



References

Griffin, D. and Tversky, A. (1992), The weighing of evidence and the determinants of confidence, *Cognitive Psychology* **24**(3), 411–435.