Finding useful questions: on Bayesian diagnosticity, probability, impact, and information gain (supplemental material)

This document provides complete description of Simulations 1.1-1.3, and their results, and additional Simulation 2 results, including each sampling norm's assessment of individual questions' usefulness, and a broader array of prior probabilities than reported in tables B1-B6. Note that because these simulations concern the usefulness of questions, rather than answers (e.g. the usefulness of random variables, rather than the usefulness of particular values taken by those variables), KL distance and information gain are identical, and are referred to simply as information gain in this document.

Simulations 1.1-1.3: Do the sampling norms ever disagree?

Simulations 1.1-1.3 addressed whether the sampling norms make contradictory claims about what questions should be asked, in multiple environments. Computer programs were written (in Matlab) to simulate the behavior of diagnosticity, log diagnosticity, information gain-KL distance, and probability gain, in the two-category, two-binary-feature scenario. Three different statistical environments were simulated. (The notation used in this document can be related to the Vuma cover story as follows: Q_1 and Q_2, respectively, are the Hula and Drink questions; q_1 and q_2 are the answers hulaWorn and drinksTea; and c_1 and c_2 are the categories glom and fizo.)

Methods. In each simulation, a total of 1,000,000 random trials were generated. On every trial, each norm's rating of two questions, Q_1 and Q_2, was evaluated as either $Q_1>Q_2$, $Q_1=Q_2$, or $Q_2>Q_1$. Simulation 1.1 was designed to explore the widest array of situations possible within the two-category, two-binary-feature scenario. In each trial of Simulation 1.1, random feature probabilities were assigned to $P(q_1 \mid c_1)$, $P(q_1 \mid c_2)$, $P(q_2 \mid c_1)$, and $P(q_2 \mid c_2)$. Prior probabilities of c_1 and c_2 were also random; 1000 trials were run at each of 1000 randomly selected values of $P(c_1)$. ("Random probabilities" denotes pseudorandom numbers independently sampled from a uniform distribution between [0,1]). Simulation 1.2 used equal prior probabilities, with $P(c_1)=P(c_2)=0.50$. The assumption of exactly equal prior probabilities may not accurately reflect many natural environments; however, it matches most scenarios in experimental research on the usefulness of the queries that people select, and appears to match participants' assumptions on the glom-versus-fizo task. As in Simulation 1.1, feature probabilities were random. Simulation 1.3 used an environment where both features were rare. In Simulation 1.3, feature probabilities were pseudorandomly chosen from a uniform distribution between [0, 0.5]. Simulation 1.3, like Simulation 1.1, consisted of 1000 trials at each of 1000 random $P(c_1)$. Each simulation was repeated 10 times.

Table S1. Simulations 1.1, random; 1.2, equal priors; 1.3, rare features

Outcome	*Simulation No.* 1.1	1.2	1.3
All norms agree (diagnosticity, log diagnosticity, information gain and probability gain)	45.9^	93.0	30.1^
Probability gain indifferent; other norms agree	42.5^	-	57.4^
All other norms disagree with probability gain	3.8	1.8	3.9
Information gain disagrees with all other norms	0.0	0.6	0.1
Probability gain indifferent; information gain disagrees with diagnosticity, log diagnosticity	2.2	-	3.0
Diagnosticity, log diagnosticity disagree with information gain, probability gain	1.6	0.3	1.4
Diagnosticity disagrees with all other norms	1.2	2.6	0.5
Probability gain indifferent; diagnosticity disagrees with information gain, log diagnosticity	0.8	-	0.7
Log diagnosticity disagree with all other norms	1.3	-	1.4
Probability gain indifferent; log diagnosticity disagrees with information gain, diagnosticity	0.5	-	1.1
Information gain, diagnosticity disagree with log diagnosticity, probability gain	0.2	1.7	0.3
Information gain, log diagnosticity disagree with probability gain, diagnosticity	0.1	-	0.1
Other cases	-	-	-

Note. Mean percentage of trials with each outcome, over 10 repetitions of the simulations. Standard error was <0.1%, except <0.5% as noted (^).

Results and discussion. A complete list of observed types of disagreement is given in Table S1, along with the observed frequency of occurrence, in each simulation. In all three simulations, every possible type of pairwise disagreement occurred. Likewise, all three simulations produced cases of disagreement with and without extreme feature values; having a feature probability close to 0 or 1 is not necessary for a dispute to occur. When prior probabilities of c_1 and c_2 were random (Simulations 1.1 and 1.3) sometimes both questions had zero probability gain. In Simulation 1.3, because prior probabilities of c_1 and c_2 were equal, probability gain was never zero. Simulation 1.3, with rare features, had results similar to the results from Simulation 1.1, but showed an increase in both the percentage of trials that were disputed, and the percentage of

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trials in which both questions had zero probability gain. Taken together, these simulations demonstrate that in a variety of statistical environments, using one sampling norm leads to asking different questions than using another norm.

Simulation 2: Cases of maximal disagreement

The following tables provide additional results from Simulation 2. Each table gives the results of an optimization to find the feature probabilities that maximize the disagreement between two sampling norms about which of the two questions, Q_1 or Q_2 (Hula or Drink) is most useful, given a particular prior probability of c_1 (glom). *DStr* (disagreement strength) is the geometric mean of the two contrasted norms' opposing preference strengths, as defined in Appendix B of the article. Preference strengths for all sampling norms are given for reference, irrespective of which norms are contrasted in a particular optimization. Preference strength of 100 denotes maximal preference for Q_1; 0, indifference between Q_1 and Q_2; and –100, maximal preference for Q_2. For example, preference strength of 50 would denote moderate preference for $\underline{Q_1}$. Each norm's calculation of the usefulness of questions Q_1 and Q_2, respectively, is given in the right columns of each table. See the section on Simulation 2 in the article text for description of patterns in each simulation, discussion of how limiting cases of disagreement vary as a function of P(c_1), and rationale for why the norms behave as they do.

For example, Table S5 contrasts impact, which prefers Q1, with diagnosticity, which prefers Q2. Consider the trial where P(c1)=64.0%. In this case, feature q1 is found in 99.99% of c1, and 0.01% of c2; feature q2 is found in 100.00% of c1 and 99.99% of c2. Impact strongly prefers Q1 (preference strength 99.98); diagnosticity maximally prefers Q2 (preference strength –100); DStr=(99.98*100.00)0.5=99.99. Q1 has diagnosticity 9999.00; Q2 has infinite diagnosticity, because the possible absence of the feature, though rare, would provide certainty that the category is c2. Q1 has impact 0.46; Q2 has impact 0.00 (to two decimal places). "Inf" notes infinity in the tables.

Table S2. Log diagnosticity (prefers Q_1) vs. diagnosticity (prefers Q_2)

P(c_1)	Feature probabilities				DStr	Preference strengths of each norm					Usefulness of Q_1 and Q_2, respectively, as calculated by each norm									
	P(q_1|c_1)	P(q_1|c_2)	P(q_2|c_1)	P(q_2|c_2)		Diagn.	Log d.	I. gain	P. gain	Impact	Diagnosticity		Log diagn.		Info. gain		Prob. gain		Impact	
50%	99.90	0.10	53.66	0.01	99.66	-99.70	99.62	99.16	87.06	88.50	999.00	1441.54	3.00	1.25	0.99	0.34	0.50	0.27	0.50	0.27
52	99.86	0.14	99.99	50.87	99.67	-99.70	99.63	99.40	88.75	91.30	713.29	1160.36	2.85	1.09	0.98	0.31	0.48	0.24	0.50	0.25
54	0.11	99.89	0.01	54.01	99.68	-99.70	99.65	99.04	83.73	88.02	908.09	1343.78	2.96	1.18	0.98	0.35	0.46	0.25	0.50	0.27
56	0.15	99.85	99.99	50.45	99.67	-99.68	99.66	99.24	85.44	90.66	665.67	1082.12	2.82	1.04	0.97	0.32	0.44	0.22	0.49	0.24
58	0.11	99.89	99.99	43.79	99.68	-99.69	99.67	98.63	78.18	85.71	908.09	1329.09	2.96	1.16	0.97	0.37	0.42	0.24	0.49	0.27
60	99.90	0.10	0.01	62.76	99.68	-99.78	99.58	97.45	69.45	79.14	999.00	1577.91	3.00	1.27	0.96	0.43	0.40	0.25	0.48	0.30
62	0.19	99.82	99.99	49.73	99.67	-99.68	99.66	98.86	79.13	88.76	543.42	962.23	2.73	0.95	0.94	0.32	0.38	0.19	0.47	0.24
64	0.22	99.75	0.01	46.57	99.65	-99.63	99.66	98.98	79.73	90.27	418.69	782.61	2.62	0.84	0.92	0.29	0.36	0.17	0.46	0.21
66	0.17	99.81	0.01	53.72	99.68	-99.70	99.66	98.08	71.58	84.63	546.43	983.31	2.74	0.95	0.91	0.35	0.34	0.18	0.45	0.24
68	99.79	0.22	99.99	49.77	99.66	-99.62	99.69	98.20	71.98	86.14	460.50	809.40	2.66	0.85	0.88	0.32	0.32	0.16	0.43	0.22
70	99.87	0.13	0.01	62.03	99.68	-99.65	99.70	95.87	58.12	74.63	768.23	1156.89	2.89	1.05	0.87	0.40	0.30	0.19	0.42	0.26
72	99.91	0.16	0.01	65.88	99.68	-99.71	99.66	94.19	51.36	68.68	760.31	1218.11	2.87	1.09	0.84	0.43	0.28	0.18	0.40	0.27
74	99.86	0.14	99.99	33.38	99.69	-99.70	99.67	93.03	47.55	65.88	713.29	1156.91	2.85	1.06	0.81	0.43	0.26	0.17	0.38	0.26
76	99.59	0.32	0.01	49.04	99.59	-99.54	99.65	96.37	60.21	80.28	294.72	579.28	2.47	0.69	0.76	0.28	0.24	0.12	0.36	0.18
78	0.19	99.90	0.01	79.24	99.63	-99.73	99.53	82.13	27.46	43.86	893.60	1385.97	2.94	1.24	0.74	0.50	0.22	0.17	0.34	0.27
80	0.17	99.82	0.01	76.77	99.61	-99.80	99.41	82.60	27.90	45.30	561.16	1182.98	2.75	1.13	0.71	0.46	0.20	0.15	0.32	0.25
82	0.18	99.82	99.99	30.51	99.63	-99.58	99.69	86.13	32.32	52.15	554.56	872.63	2.74	0.93	0.66	0.38	0.18	0.12	0.29	0.21
84	99.81	0.20	99.99	28.27	99.62	-99.59	99.64	82.31	27.15	46.06	503.28	826.96	2.70	0.93	0.62	0.38	0.16	0.11	0.27	0.19
86	99.86	0.14	36.22	0.01	99.54	-99.68	99.40	96.59	66.68	73.27	713.29	1129.35	2.85	1.24	0.57	0.08	0.14	0.00	0.24	0.09
88	0.25	99.75	99.99	25.05	99.54	-99.53	99.55	72.89	18.16	34.79	399.00	678.39	2.60	0.90	0.51	0.34	0.12	0.09	0.21	0.16
90	99.85	0.21	29.73	0.01	99.51	-99.56	99.47	93.94	52.86	65.41	494.67	796.56	2.69	1.04	0.46	0.05	0.10	0.00	0.18	0.05
92	0.16	99.85	67.24	99.99	99.52	-99.59	99.46	90.86	44.50	55.94	662.22	988.43	2.82	1.18	0.39	0.04	0.08	0.00	0.15	0.05
94	99.85	0.15	67.90	99.99	99.52	-99.57	99.47	86.45	35.11	46.66	665.67	969.63	2.82	1.18	0.32	0.03	0.06	0.00	0.11	0.04
96	99.85	0.15	31.51	0.01	99.51	-99.54	99.47	78.67	24.43	35.05	665.67	954.20	2.82	1.17	0.23	0.02	0.04	0.00	0.08	0.02
98	0.14	99.85	32.22	0.01	99.50	-99.63	99.38	63.10	12.65	19.95	666.75	1018.38	2.82	1.22	0.13	0.01	0.02	0.00	0.04	0.01
99.5	99.86	0.16	68.27	99.99	99.50	-99.64	99.33	33.17	2.62	5.58	624.69	1002.76	2.80	1.22	0.04	0.00	0.00	0.00	0.01	0.00

Table S3. Information gain (prefers Q_1) vs. diagnosticity (prefers Q_2)

P(c_1)	Feature probabilities				DStr	Preference strengths of each norm					Usefulness of Q_1 and Q_2, respectively, as calculated by each norm									
	P(q_1|c_1)	P(q_1|c_2)	P(q_2|c_1)	P(q_2|c_2)		Diagn.	Log d.	I. gain	P. gain	Impact	Diagnosticity		Log diagn.		Info. gain		Prob. gain		Impact	
50%	99.99	0.01	100.00	99.99	100.00	-100.00	-100.00	100.00	100.00	100.00	9999.00	Inf	4.00	Inf	1.00	0.00	0.50	0.00	0.50	0.00
52	0.01	99.99	99.99	100.00	100.00	-100.00	-100.00	100.00	100.00	100.00	9999.00	Inf	4.00	Inf	1.00	0.00	0.48	0.00	0.50	0.00
54	99.99	0.01	0.01	0.00	100.00	-100.00	-100.00	100.00	99.98	100.00	9999.00	Inf	4.00	Inf	0.99	0.00	0.46	0.00	0.50	0.00
56	0.01	99.99	99.99	100.00	100.00	-100.00	-100.00	100.00	99.89	100.00	9999.00	Inf	4.00	Inf	0.99	0.00	0.44	0.00	0.49	0.00
58	0.01	99.99	0.01	0.00	100.00	-100.00	-100.00	100.00	99.70	100.00	9999.00	Inf	4.00	Inf	0.98	0.00	0.42	0.00	0.49	0.00
60	99.99	0.01	0.01	0.00	100.00	-100.00	-100.00	100.00	99.43	100.00	9999.00	Inf	4.00	Inf	0.97	0.00	0.40	0.00	0.48	0.00
62	0.01	99.99	0.01	0.00	100.00	-100.00	-100.00	100.00	98.96	99.99	9999.00	Inf	4.00	Inf	0.96	0.00	0.38	0.00	0.47	0.00
64	99.99	0.01	0.01	0.00	100.00	-100.00	-100.00	100.00	98.38	99.98	9999.00	Inf	4.00	Inf	0.94	0.00	0.36	0.00	0.46	0.00
66	99.99	0.01	99.99	100.00	100.00	-100.00	-100.00	99.99	97.53	99.94	9999.00	Inf	4.00	Inf	0.92	0.00	0.34	0.00	0.45	0.00
68	99.99	0.01	99.99	100.00	99.99	-100.00	-100.00	99.99	96.42	99.87	9999.00	Inf	4.00	Inf	0.90	0.00	0.32	0.00	0.44	0.00
70	0.01	99.99	0.01	0.00	99.99	-100.00	-100.00	99.98	95.02	99.77	9999.00	Inf	4.00	Inf	0.88	0.00	0.30	0.00	0.42	0.00
72	99.99	0.01	0.01	0.00	99.98	-100.00	-100.00	99.96	93.26	99.59	9999.00	Inf	4.00	Inf	0.85	0.00	0.28	0.00	0.40	0.00
74	99.99	0.01	0.01	0.00	99.96	-100.00	-100.00	99.93	91.08	99.26	9999.00	Inf	4.00	Inf	0.83	0.00	0.26	0.00	0.38	0.00
76	0.01	99.99	0.01	0.00	99.94	-100.00	-100.00	99.88	88.40	98.80	9999.00	Inf	4.00	Inf	0.79	0.00	0.24	0.00	0.36	0.00
78	0.01	99.99	0.01	0.00	99.89	-100.00	-100.00	99.79	85.35	98.04	9999.00	Inf	4.00	Inf	0.76	0.00	0.22	0.00	0.34	0.00
80	99.99	0.01	99.99	100.00	99.83	-100.00	-100.00	99.67	81.74	96.98	9999.00	Inf	4.00	Inf	0.72	0.00	0.20	0.00	0.32	0.00
82	99.99	0.01	0.01	0.00	99.71	-100.00	-100.00	99.42	77.51	95.40	9999.00	Inf	4.00	Inf	0.68	0.00	0.18	0.00	0.30	0.00
84	99.99	0.01	0.01	0.00	99.52	-100.00	-100.00	99.04	72.63	93.03	9999.00	Inf	4.00	Inf	0.63	0.00	0.16	0.00	0.27	0.00
86	99.99	0.01	0.01	0.00	99.21	-100.00	-100.00	98.44	67.03	89.86	9999.00	Inf	4.00	Inf	0.58	0.00	0.14	0.00	0.24	0.00
88	0.01	99.99	99.99	100.00	98.71	-100.00	-100.00	97.44	60.69	85.52	9999.00	Inf	4.00	Inf	0.53	0.00	0.12	0.00	0.21	0.00
90	0.01	99.99	0.01	0.00	97.98	-100.00	-100.00	96.01	53.42	79.56	9999.00	Inf	4.00	Inf	0.47	0.00	0.10	0.00	0.18	0.00
92	0.01	99.99	99.99	100.00	96.75	-100.00	-100.00	93.61	45.13	71.70	9999.00	Inf	4.00	Inf	0.40	0.00	0.08	0.00	0.15	0.00
94	99.99	0.01	99.99	100.00	94.63	-100.00	-100.00	89.54	35.77	61.18	9999.00	Inf	4.00	Inf	0.33	0.00	0.06	0.00	0.11	0.00
96	99.99	0.01	0.01	0.00	90.70	-100.00	-100.00	82.27	25.21	46.90	9999.00	Inf	4.00	Inf	0.24	0.00	0.04	0.00	0.08	0.00
98	0.01	99.99	99.99	100.00	81.94	-100.00	-100.00	67.14	13.46	27.66	9999.00	Inf	4.00	Inf	0.14	0.00	0.02	0.00	0.04	0.00
99.5	99.99	0.01	99.99	100.00	60.64	-100.00	-100.00	36.77	3.53	8.08	9999.00	Inf	4.00	Inf	0.04	0.00	0.00	0.00	0.01	0.00

Table S4. Information gain (prefers Q_1) vs. log diagnosticity (prefers Q_2)

P(c_1)	Feature probabilities				DStr	Preference strengths of each norm					Usefulness of Q_1 and Q_2, respectively, as calculated by each norm									
	P(q_1|c_1)	P(q_1|c_2)	P(q_2|c_1)	P(q_2|c_2)		Diagn.	Log d.	I. gain	P. gain	Impact	Diagnosticity		Log diagn.		Info. gain		Prob. gain		Impact	
50%	99.99	0.01	99.99	100.00	100.00	-100.00	-100.00	100.00	100.00	100.00	9999.00	Inf	4.00	Inf	1.00	0.00	0.50	0.00	0.50	0.00
52	99.99	0.01	99.99	100.00	100.00	-100.00	-100.00	100.00	100.00	100.00	9999.00	Inf	4.00	Inf	1.00	0.00	0.48	0.00	0.50	0.00
54	0.01	99.99	99.99	100.00	100.00	-100.00	-100.00	100.00	99.98	100.00	9999.00	Inf	4.00	Inf	0.99	0.00	0.46	0.00	0.50	0.00
56	99.99	0.01	0.01	0.00	100.00	-100.00	-100.00	100.00	99.89	100.00	9999.00	Inf	4.00	Inf	0.99	0.00	0.44	0.00	0.49	0.00
58	0.01	99.99	0.01	0.00	100.00	-100.00	-100.00	100.00	99.70	100.00	9999.00	Inf	4.00	Inf	0.98	0.00	0.42	0.00	0.49	0.00
60	99.99	0.01	0.01	0.00	100.00	-100.00	-100.00	100.00	99.43	100.00	9999.00	Inf	4.00	Inf	0.97	0.00	0.40	0.00	0.48	0.00
62	0.01	99.99	0.01	0.00	100.00	-100.00	-100.00	100.00	98.96	99.99	9999.00	Inf	4.00	Inf	0.96	0.00	0.38	0.00	0.47	0.00
64	0.01	99.99	99.99	100.00	100.00	-100.00	-100.00	100.00	98.38	99.98	9999.00	Inf	4.00	Inf	0.94	0.00	0.36	0.00	0.46	0.00
66	99.99	0.01	0.01	0.00	100.00	-100.00	-100.00	99.99	97.53	99.94	9999.00	Inf	4.00	Inf	0.92	0.00	0.34	0.00	0.45	0.00
68	0.01	99.99	99.99	100.00	99.99	-100.00	-100.00	99.99	96.42	99.87	9999.00	Inf	4.00	Inf	0.90	0.00	0.32	0.00	0.44	0.00
70	0.01	99.99	0.01	0.00	99.99	-100.00	-100.00	99.98	95.02	99.77	9999.00	Inf	4.00	Inf	0.88	0.00	0.30	0.00	0.42	0.00
72	0.01	99.99	99.99	100.00	99.98	-100.00	-100.00	99.96	93.26	99.59	9999.00	Inf	4.00	Inf	0.85	0.00	0.28	0.00	0.40	0.00
74	99.99	0.01	99.99	100.00	99.96	-100.00	-100.00	99.93	91.08	99.26	9999.00	Inf	4.00	Inf	0.83	0.00	0.26	0.00	0.38	0.00
76	99.99	0.01	99.99	100.00	99.94	-100.00	-100.00	99.88	88.40	98.80	9999.00	Inf	4.00	Inf	0.79	0.00	0.24	0.00	0.36	0.00
78	0.01	99.99	0.01	0.00	99.89	-100.00	-100.00	99.79	85.35	98.04	9999.00	Inf	4.00	Inf	0.76	0.00	0.22	0.00	0.34	0.00
80	0.01	99.99	0.01	0.00	99.83	-100.00	-100.00	99.67	81.74	96.98	9999.00	Inf	4.00	Inf	0.72	0.00	0.20	0.00	0.32	0.00
82	0.01	99.99	0.01	0.00	99.71	-100.00	-100.00	99.42	77.51	95.40	9999.00	Inf	4.00	Inf	0.68	0.00	0.18	0.00	0.30	0.00
84	0.01	99.99	0.01	0.00	99.52	-100.00	-100.00	99.04	72.63	93.03	9999.00	Inf	4.00	Inf	0.63	0.00	0.16	0.00	0.27	0.00
86	99.99	0.01	0.01	0.00	99.21	-100.00	-100.00	98.44	67.03	89.86	9999.00	Inf	4.00	Inf	0.58	0.00	0.14	0.00	0.24	0.00
88	0.01	99.99	0.01	0.00	98.71	-100.00	-100.00	97.44	60.69	85.52	9999.00	Inf	4.00	Inf	0.53	0.00	0.12	0.00	0.21	0.00
90	99.99	0.01	99.99	100.00	97.98	-100.00	-100.00	96.01	53.42	79.56	9999.00	Inf	4.00	Inf	0.47	0.00	0.10	0.00	0.18	0.00
92	0.01	99.99	99.99	100.00	96.75	-100.00	-100.00	93.61	45.13	71.70	9999.00	Inf	4.00	Inf	0.40	0.00	0.08	0.00	0.15	0.00
94	99.99	0.01	0.01	0.00	94.63	-100.00	-100.00	89.54	35.77	61.18	9999.00	Inf	4.00	Inf	0.33	0.00	0.06	0.00	0.11	0.00
96	99.99	0.01	0.01	0.00	90.70	-100.00	-100.00	82.27	25.21	46.90	9999.00	Inf	4.00	Inf	0.24	0.00	0.04	0.00	0.08	0.00
98	99.99	0.01	0.01	0.00	81.94	-100.00	-100.00	67.14	13.46	27.66	9999.00	Inf	4.00	Inf	0.14	0.00	0.02	0.00	0.04	0.00
99.5	99.99	0.01	0.01	0.00	60.64	-100.00	-100.00	36.77	3.53	8.08	9999.00	Inf	4.00	Inf	0.04	0.00	0.00	0.00	0.01	0.00

Table S5. Impact (prefers Q_1) vs. diagnosticity (prefers Q_2)

P(c_1)	Feature probabilities				DStr	Preference strengths of each norm					Usefulness of Q_1 and Q_2, respectively, as calculated by each norm									
	P(q_1|c_1)	P(q_1|c_2)	P(q_2|c_1)	P(q_2|c_2)		Diagn.	Log d.	I. gain	P. gain	Impact	Diagnosticity		Log diagn.		Info. gain		Prob. gain		Impact	
50%	99.99	0.01	100.00	99.99	100.00	-100.00	-100.00	100.00	100.00	100.00	9999.00	Inf	4.00	Inf	1.00	0.00	0.50	0.00	0.50	0.00
52	99.99	0.01	100.00	99.99	100.00	-100.00	-100.00	100.00	100.00	100.00	9999.00	Inf	4.00	Inf	1.00	0.00	0.48	0.00	0.50	0.00
54	0.01	99.99	0.00	0.01	100.00	-100.00	-100.00	100.00	99.98	100.00	9999.00	Inf	4.00	Inf	0.99	0.00	0.46	0.00	0.50	0.00
56	0.01	99.99	0.00	0.01	100.00	-100.00	-100.00	100.00	99.89	100.00	9999.00	Inf	4.00	Inf	0.99	0.00	0.44	0.00	0.49	0.00
58	99.99	0.01	100.00	99.99	100.00	-100.00	-100.00	100.00	99.70	100.00	9999.00	Inf	4.00	Inf	0.98	0.00	0.42	0.00	0.49	0.00
60	0.01	99.99	0.00	0.01	100.00	-100.00	-100.00	100.00	99.43	100.00	9999.00	Inf	4.00	Inf	0.97	0.00	0.40	0.00	0.48	0.00
62	0.01	99.99	99.99	100.00	100.00	-100.00	-100.00	100.00	98.96	99.99	9999.00	Inf	4.00	Inf	0.96	0.00	0.38	0.00	0.47	0.00
64	99.99	0.01	100.00	99.99	99.99	-100.00	-100.00	100.00	98.38	99.98	9999.00	Inf	4.00	Inf	0.94	0.00	0.36	0.00	0.46	0.00
66	0.01	99.99	0.01	0.00	99.97	-100.00	-100.00	99.99	97.53	99.94	9999.00	Inf	4.00	Inf	0.92	0.00	0.34	0.00	0.45	0.00
68	0.01	99.99	100.00	99.99	99.93	-100.00	-100.00	99.99	96.42	99.87	9999.00	Inf	4.00	Inf	0.90	0.00	0.32	0.00	0.44	0.00
70	0.01	99.99	0.01	0.00	99.89	-100.00	-100.00	99.98	95.02	99.77	9999.00	Inf	4.00	Inf	0.88	0.00	0.30	0.00	0.42	0.00
72	99.99	0.01	99.99	100.00	99.80	-100.00	-100.00	99.96	93.26	99.59	9999.00	Inf	4.00	Inf	0.85	0.00	0.28	0.00	0.40	0.00
74	99.99	0.01	99.99	100.00	99.63	-100.00	-100.00	99.93	91.08	99.26	9999.00	Inf	4.00	Inf	0.83	0.00	0.26	0.00	0.38	0.00
76	99.99	0.01	100.00	99.99	99.40	-100.00	-100.00	99.88	88.40	98.80	9999.00	Inf	4.00	Inf	0.79	0.00	0.24	0.00	0.36	0.00
78	0.01	99.99	100.00	99.99	99.02	-100.00	-100.00	99.79	85.35	98.04	9999.00	Inf	4.00	Inf	0.76	0.00	0.22	0.00	0.34	0.00
80	0.01	99.99	0.01	0.00	98.48	-100.00	-100.00	99.67	81.74	96.98	9999.00	Inf	4.00	Inf	0.72	0.00	0.20	0.00	0.32	0.00
82	0.01	99.99	0.01	0.00	97.68	-100.00	-100.00	99.42	77.51	95.40	9999.00	Inf	4.00	Inf	0.68	0.00	0.18	0.00	0.30	0.00
84	99.99	0.01	0.01	0.00	96.45	-100.00	-100.00	99.04	72.63	93.03	9999.00	Inf	4.00	Inf	0.63	0.00	0.16	0.00	0.27	0.00
86	99.99	0.01	0.01	0.00	94.79	-100.00	-100.00	98.44	67.03	89.86	9999.00	Inf	4.00	Inf	0.58	0.00	0.14	0.00	0.24	0.00
88	0.01	99.99	0.01	0.00	92.48	-100.00	-100.00	97.44	60.69	85.52	9999.00	Inf	4.00	Inf	0.53	0.00	0.12	0.00	0.21	0.00
90	0.01	99.99	99.99	100.00	89.20	-100.00	-100.00	96.01	53.42	79.56	9999.00	Inf	4.00	Inf	0.47	0.00	0.10	0.00	0.18	0.00
92	99.99	0.01	0.01	0.00	84.67	-100.00	-100.00	93.61	45.13	71.70	9999.00	Inf	4.00	Inf	0.40	0.00	0.08	0.00	0.15	0.00
94	99.99	0.01	0.01	0.00	78.22	-100.00	-100.00	89.54	35.77	61.18	9999.00	Inf	4.00	Inf	0.33	0.00	0.06	0.00	0.11	0.00
96	99.99	0.01	0.01	0.00	68.49	-100.00	-100.00	82.27	25.21	46.90	9999.00	Inf	4.00	Inf	0.24	0.00	0.04	0.00	0.08	0.00
98	0.01	99.99	99.99	100.00	52.59	-100.00	-100.00	67.14	13.46	27.66	9999.00	Inf	4.00	Inf	0.14	0.00	0.02	0.00	0.04	0.00
99.5	0.01	99.99	100.00	99.99	28.42	-100.00	-100.00	36.77	3.53	8.08	9999.00	Inf	4.00	Inf	0.04	0.00	0.00	0.00	0.01	0.00

Table S6. Impact (prefers Q_1) vs. log diagnosticity (prefers Q_2)

P(c_1)	Feature probabilities				DStr	Preference strengths of each norm					Usefulness of Q_1 and Q_2, respectively, as calculated by each norm									
	P(q_1|c_1)	P(q_1|c_2)	P(q_2|c_1)	P(q_2|c_2)		Diagn.	Log d.	I. gain	P. gain	Impact	Diagnosticity		Log diagn.		Info. gain		Prob. gain		Impact	
50%	0.01	99.99	0.01	0.00	100.00	-100.00	-100.00	100.00	100.00	100.00	9999.00	Inf	4.00	Inf	1.00	0.00	0.50	0.00	0.50	0.00
52	0.01	99.99	0.01	0.00	100.00	-100.00	-100.00	100.00	100.00	100.00	9999.00	Inf	4.00	Inf	1.00	0.00	0.48	0.00	0.50	0.00
54	0.01	99.99	0.01	0.00	100.00	-100.00	-100.00	100.00	99.98	100.00	9999.00	Inf	4.00	Inf	0.99	0.00	0.46	0.00	0.50	0.00
56	0.01	99.99	99.99	100.00	100.00	-100.00	-100.00	100.00	99.89	100.00	9999.00	Inf	4.00	Inf	0.99	0.00	0.44	0.00	0.49	0.00
58	99.99	0.01	99.99	100.00	100.00	-100.00	-100.00	100.00	99.70	100.00	9999.00	Inf	4.00	Inf	0.98	0.00	0.42	0.00	0.49	0.00
60	0.01	99.99	99.99	100.00	100.00	-100.00	-100.00	100.00	99.43	100.00	9999.00	Inf	4.00	Inf	0.97	0.00	0.40	0.00	0.48	0.00
62	0.01	99.99	0.00	0.01	100.00	-100.00	-100.00	100.00	98.96	99.99	9999.00	Inf	4.00	Inf	0.96	0.00	0.38	0.00	0.47	0.00
64	0.01	99.99	99.99	100.00	99.99	-100.00	-100.00	100.00	98.38	99.98	9999.00	Inf	4.00	Inf	0.94	0.00	0.36	0.00	0.46	0.00
66	0.01	99.99	0.01	0.00	99.97	-100.00	-100.00	99.99	97.53	99.94	9999.00	Inf	4.00	Inf	0.92	0.00	0.34	0.00	0.45	0.00
68	0.01	99.99	99.99	100.00	99.93	-100.00	-100.00	99.99	96.42	99.87	9999.00	Inf	4.00	Inf	0.90	0.00	0.32	0.00	0.44	0.00
70	99.99	0.01	99.99	100.00	99.89	-100.00	-100.00	99.98	95.02	99.77	9999.00	Inf	4.00	Inf	0.88	0.00	0.30	0.00	0.42	0.00
72	0.01	99.99	0.00	0.01	99.80	-100.00	-100.00	99.96	93.26	99.59	9999.00	Inf	4.00	Inf	0.85	0.00	0.28	0.00	0.40	0.00
74	99.99	0.01	0.01	0.00	99.63	-100.00	-100.00	99.93	91.08	99.26	9999.00	Inf	4.00	Inf	0.83	0.00	0.26	0.00	0.38	0.00
76	0.01	99.99	99.99	100.00	99.40	-100.00	-100.00	99.88	88.40	98.80	9999.00	Inf	4.00	Inf	0.79	0.00	0.24	0.00	0.36	0.00
78	0.01	99.99	0.01	0.00	99.02	-100.00	-100.00	99.79	85.35	98.04	9999.00	Inf	4.00	Inf	0.76	0.00	0.22	0.00	0.34	0.00
80	99.99	0.01	0.01	0.00	98.48	-100.00	-100.00	99.67	81.74	96.98	9999.00	Inf	4.00	Inf	0.72	0.00	0.20	0.00	0.32	0.00
82	99.99	0.01	0.01	0.00	97.68	-100.00	-100.00	99.42	77.51	95.40	9999.00	Inf	4.00	Inf	0.68	0.00	0.18	0.00	0.30	0.00
84	0.01	99.99	0.01	0.00	96.45	-100.00	-100.00	99.04	72.63	93.03	9999.00	Inf	4.00	Inf	0.63	0.00	0.16	0.00	0.27	0.00
86	99.99	0.01	0.01	0.00	94.79	-100.00	-100.00	98.44	67.03	89.86	9999.00	Inf	4.00	Inf	0.58	0.00	0.14	0.00	0.24	0.00
88	99.99	0.01	0.01	0.00	92.48	-100.00	-100.00	97.44	60.69	85.52	9999.00	Inf	4.00	Inf	0.53	0.00	0.12	0.00	0.21	0.00
90	99.99	0.01	0.00	0.01	89.20	-100.00	-100.00	96.01	53.42	79.56	9999.00	Inf	4.00	Inf	0.47	0.00	0.10	0.00	0.18	0.00
92	0.01	99.99	99.99	100.00	84.67	-100.00	-100.00	93.61	45.13	71.70	9999.00	Inf	4.00	Inf	0.40	0.00	0.08	0.00	0.15	0.00
94	99.99	0.01	0.01	0.00	78.22	-100.00	-100.00	89.54	35.77	61.18	9999.00	Inf	4.00	Inf	0.33	0.00	0.06	0.00	0.11	0.00
96	99.99	0.01	99.99	100.00	68.49	-100.00	-100.00	82.27	25.21	46.90	9999.00	Inf	4.00	Inf	0.24	0.00	0.04	0.00	0.08	0.00
98	99.99	0.01	0.01	0.00	52.59	-100.00	-100.00	67.14	13.46	27.66	9999.00	Inf	4.00	Inf	0.14	0.00	0.02	0.00	0.04	0.00
99.5	0.01	99.99	99.99	100.00	28.42	-100.00	-100.00	36.77	3.53	8.08	9999.00	Inf	4.00	Inf	0.04	0.00	0.00	0.00	0.01	0.00

Table S7. Probability gain (prefers Q_1) vs. diagnosticity (prefers Q_2)

$P(c_1)$	Feature probabilities				DStr	Preference strengths of each norm					Usefulness of Q_1 and Q_2, respectively, as calculated by each norm									
	$P(q_1\|c_1)$	$P(q_1\|c_2)$	$P(q_2\|c_1)$	$P(q_2\|c_2)$		Diagn.	Log d.	I. gain	P. gain	Impact	Diagnosticity		Log diagn.		Info. gain		Prob. gain		Impact	
50%	0.01	99.99	0.00	0.01	100.00	-100.00	-100.00	100.00	100.00	100.00	9999.00	Inf	4.00	Inf	1.00	0.00	0.50	0.00	0.50	0.00
52	0.01	99.99	92.54	100.00	100.00	-100.00	-100.00	100.00	100.00	99.98	9999.00	Inf	4.00	Inf	1.00	0.04	0.48	0.00	0.50	0.04
54	99.99	0.01	3.01	0.00	99.99	-100.00	-100.00	100.00	99.98	100.00	9999.00	Inf	4.00	Inf	0.99	0.01	0.46	0.00	0.50	0.01
56	0.01	99.99	0.59	0.00	99.94	-100.00	-100.00	100.00	99.89	100.00	9999.00	Inf	4.00	Inf	0.99	0.00	0.44	0.00	0.49	0.00
58	99.99	0.01	10.45	0.00	99.85	-100.00	-100.00	100.00	99.70	99.88	9999.00	Inf	4.00	Inf	0.98	0.05	0.42	0.00	0.49	0.05
60	0.01	99.99	86.87	100.00	99.72	-100.00	-100.00	99.99	99.43	99.75	9999.00	Inf	4.00	Inf	0.97	0.06	0.40	0.00	0.48	0.06
62	0.01	99.99	11.04	0.00	99.48	-100.00	-100.00	99.99	98.96	99.77	9999.00	Inf	4.00	Inf	0.96	0.05	0.38	0.00	0.47	0.05
64	99.99	0.01	37.19	0.00	99.19	-100.00	-100.00	99.79	98.38	94.94	9999.00	Inf	4.00	Inf	0.94	0.18	0.36	0.00	0.46	0.17
66	0.01	99.99	55.62	100.00	98.75	-100.00	-100.00	99.58	97.53	90.93	9999.00	Inf	4.00	Inf	0.92	0.22	0.34	0.00	0.45	0.20
68	0.01	99.99	47.90	100.00	98.19	-100.00	-100.00	99.13	96.42	85.03	9999.00	Inf	4.00	Inf	0.90	0.26	0.32	0.00	0.44	0.23
70	0.01	99.99	9.14	0.00	97.48	-100.00	-100.00	99.95	95.02	99.19	9999.00	Inf	4.00	Inf	0.88	0.03	0.30	0.00	0.42	0.04
72	99.99	0.01	46.66	0.00	96.57	-100.00	-100.00	99.19	93.26	86.16	9999.00	Inf	4.00	Inf	0.85	0.20	0.28	0.00	0.40	0.19
74	0.01	99.99	61.46	0.00	95.44	-100.00	-100.00	97.76	91.08	71.96	9999.00	Inf	4.00	Inf	0.83	0.28	0.26	0.00	0.38	0.24
76	99.99	0.01	12.53	0.00	94.02	-100.00	-100.00	99.78	88.40	96.94	9999.00	Inf	4.00	Inf	0.79	0.04	0.24	0.00	0.36	0.05
78	0.01	99.99	0.02	0.00	92.39	-100.00	-100.00	99.79	85.35	98.04	9999.00	Inf	4.00	Inf	0.76	0.00	0.22	0.00	0.34	0.00
80	0.01	99.99	49.48	100.00	90.41	-100.00	-100.00	97.86	81.74	74.60	9999.00	Inf	4.00	Inf	0.72	0.17	0.20	0.00	0.32	0.16
82	99.99	0.01	9.37	0.00	88.04	-100.00	-100.00	99.23	77.51	92.91	9999.00	Inf	4.00	Inf	0.68	0.02	0.18	0.00	0.30	0.03
84	99.99	0.01	99.01	100.00	85.22	-100.00	-100.00	99.03	72.63	92.77	9999.00	Inf	4.00	Inf	0.63	0.00	0.16	0.00	0.27	0.00
86	99.99	0.01	77.65	0.00	81.87	-100.00	-100.00	89.45	67.03	35.78	9999.00	Inf	4.00	Inf	0.58	0.26	0.14	0.00	0.24	0.19
88	99.99	0.01	97.77	100.00	77.90	-100.00	-100.00	97.37	60.69	84.67	9999.00	Inf	4.00	Inf	0.53	0.00	0.12	0.00	0.21	0.00
90	0.01	99.99	87.77	100.00	73.09	-100.00	-100.00	95.42	53.42	74.51	9999.00	Inf	4.00	Inf	0.47	0.02	0.10	0.00	0.18	0.02
92	99.99	0.01	0.01	0.00	67.18	-100.00	-100.00	93.61	45.13	71.70	9999.00	Inf	4.00	Inf	0.40	0.00	0.08	0.00	0.15	0.00
94	0.01	99.99	26.45	100.00	59.81	-100.00	-100.00	79.58	35.77	22.08	9999.00	Inf	4.00	Inf	0.33	0.11	0.06	0.00	0.11	0.08
96	0.01	99.99	60.04	0.00	50.21	-100.00	-100.00	75.76	25.21	22.64	9999.00	Inf	4.00	Inf	0.24	0.05	0.04	0.00	0.08	0.05
98	99.99	0.01	51.23	100.00	36.69	-100.00	-100.00	62.85	13.46	15.52	9999.00	Inf	4.00	Inf	0.14	0.02	0.02	0.00	0.04	0.02
99.5	0.01	99.99	16.43	0.00	18.78	-100.00	-100.00	36.15	3.53	6.81	9999.00	Inf	4.00	Inf	0.04	0.00	0.00	0.00	0.01	0.00

Table S8. Probability gain (prefers Q_1) vs. log diagnosticity (prefers Q_2)

$P(c_1)$	Feature probabilities				DStr	Preference strengths of each norm					Usefulness of Q_1 and Q_2, respectively, as calculated by each norm									
	$P(q_1\|c_1)$	$P(q_1\|c_2)$	$P(q_2\|c_1)$	$P(q_2\|c_2)$		Diagn.	Log d.	I. gain	P. gain	Impact	Diagnosticity		Log diagn.		Info. gain		Prob. gain		Impact	
50%	0.01	99.99	0.00	0.01	100.00	-100.00	-100.00	100.00	100.00	100.00	9999.00	Inf	4.00	Inf	1.00	0.00	0.50	0.00	0.50	0.00
52	0.01	99.99	0.72	0.00	100.00	-100.00	-100.00	100.00	100.00	100.00	9999.00	Inf	4.00	Inf	1.00	0.00	0.48	0.00	0.50	0.00
54	99.99	0.01	99.99	100.00	99.99	-100.00	-100.00	100.00	99.98	100.00	9999.00	Inf	4.00	Inf	0.99	0.00	0.46	0.00	0.50	0.00
56	0.01	99.99	0.15	0.00	99.94	-100.00	-100.00	100.00	99.89	100.00	9999.00	Inf	4.00	Inf	0.99	0.00	0.44	0.00	0.49	0.00
58	0.01	99.99	99.96	100.00	99.85	-100.00	-100.00	100.00	99.70	100.00	9999.00	Inf	4.00	Inf	0.98	0.00	0.42	0.00	0.49	0.00
60	0.01	99.99	99.85	100.00	99.72	-100.00	-100.00	100.00	99.43	100.00	9999.00	Inf	4.00	Inf	0.97	0.00	0.40	0.00	0.48	0.00
62	99.99	0.01	0.18	0.00	99.48	-100.00	-100.00	100.00	98.96	99.99	9999.00	Inf	4.00	Inf	0.96	0.00	0.38	0.00	0.47	0.00
64	99.99	0.01	0.14	0.00	99.19	-100.00	-100.00	100.00	98.38	99.98	9999.00	Inf	4.00	Inf	0.94	0.00	0.36	0.00	0.46	0.00
66	0.01	99.99	47.19	0.00	98.75	-100.00	-100.00	99.47	97.53	89.36	9999.00	Inf	4.00	Inf	0.92	0.24	0.34	0.00	0.45	0.21
68	0.01	99.99	48.71	100.00	98.19	-100.00	-100.00	99.18	96.42	85.65	9999.00	Inf	4.00	Inf	0.90	0.25	0.32	0.00	0.44	0.22
70	99.99	0.01	43.00	0.00	97.48	-100.00	-100.00	99.47	95.02	89.69	9999.00	Inf	4.00	Inf	0.88	0.19	0.30	0.00	0.42	0.18
72	99.99	0.01	55.97	0.00	96.57	-100.00	-100.00	98.58	93.26	79.05	9999.00	Inf	4.00	Inf	0.85	0.26	0.28	0.00	0.40	0.23
74	99.99	0.01	41.61	100.00	95.44	-100.00	-100.00	98.13	91.08	75.02	9999.00	Inf	4.00	Inf	0.83	0.26	0.26	0.00	0.38	0.22
76	0.01	99.99	97.82	100.00	94.02	-100.00	-100.00	99.87	88.40	98.55	9999.00	Inf	4.00	Inf	0.79	0.01	0.24	0.00	0.36	0.01
78	0.01	99.99	24.06	0.00	92.39	-100.00	-100.00	99.44	85.35	92.18	9999.00	Inf	4.00	Inf	0.76	0.08	0.22	0.00	0.34	0.08
80	0.01	99.99	6.41	0.00	90.41	-100.00	-100.00	99.57	81.74	95.71	9999.00	Inf	4.00	Inf	0.72	0.02	0.20	0.00	0.32	0.02
82	0.01	99.99	99.99	100.00	88.04	-100.00	-100.00	99.42	77.51	95.40	9999.00	Inf	4.00	Inf	0.68	0.00	0.18	0.00	0.30	0.00
84	99.99	0.01	56.14	0.00	85.22	-100.00	-100.00	95.96	72.63	62.82	9999.00	Inf	4.00	Inf	0.63	0.17	0.16	0.00	0.27	0.15
86	99.99	0.01	39.09	0.00	81.87	-100.00	-100.00	96.67	67.03	71.53	9999.00	Inf	4.00	Inf	0.58	0.09	0.14	0.00	0.24	0.09
88	0.01	99.99	42.91	100.00	77.90	-100.00	-100.00	93.36	60.69	52.82	9999.00	Inf	4.00	Inf	0.53	0.13	0.12	0.00	0.21	0.12
90	0.01	99.99	47.27	100.00	73.09	-100.00	-100.00	92.07	53.42	50.51	9999.00	Inf	4.00	Inf	0.47	0.10	0.10	0.00	0.18	0.09
92	0.01	99.99	90.60	100.00	67.18	-100.00	-100.00	93.16	45.13	67.71	9999.00	Inf	4.00	Inf	0.40	0.01	0.08	0.00	0.15	0.01
94	0.01	99.99	28.64	100.00	59.81	-100.00	-100.00	80.36	35.77	23.65	9999.00	Inf	4.00	Inf	0.33	0.10	0.06	0.00	0.11	0.08
96	0.01	99.99	0.01	0.00	50.21	-100.00	-100.00	82.27	25.21	46.90	9999.00	Inf	4.00	Inf	0.24	0.00	0.04	0.00	0.08	0.00
98	99.99	0.01	0.02	0.00	36.69	-100.00	-100.00	67.14	13.46	27.65	9999.00	Inf	4.00	Inf	0.14	0.00	0.02	0.00	0.04	0.00
99.5	0.01	99.99	99.71	100.00	18.78	-100.00	-100.00	36.76	3.53	8.06	9999.00	Inf	4.00	Inf	0.04	0.00	0.00	0.00	0.01	0.00

Table S9. Information gain (prefers Q_1) vs. probability gain (prefers Q_2)

P(c_1)	Feature probabilities				DStr	Preference strengths of each norm					Usefulness of Q_1 and Q_2, respectively, as calculated by each norm									
	P(q_1|c_1)	P(q_1|c_2)	P(q_2|c_1)	P(q_2|c_2)		Diagn.	Log d.	I. gain	P. gain	Impact	Diagnosticity		Log diagn.		Info. gain		Prob. gain		Impact	
50%	0.00	31.44	28.91	71.09	34.94	100.00	100.00	37.42	-32.61	-35.75	Inf	2.46	Inf	0.39	0.18	0.13	0.16	0.21	0.16	0.21
52	69.47	100.00	25.99	65.57	38.35	100.00	100.00	40.58	-36.24	-31.15	Inf	2.32	Inf	0.36	0.17	0.12	0.12	0.18	0.15	0.20
54	28.55	0.00	77.17	41.30	41.90	100.00	100.00	41.93	-41.87	-26.04	Inf	2.14	Inf	0.33	0.15	0.10	0.07	0.15	0.14	0.18
56	27.02	0.00	80.93	49.60	45.63	100.00	100.00	44.48	-46.80	-16.38	Inf	1.96	Inf	0.28	0.14	0.08	0.03	0.11	0.13	0.15
58	72.41	100.00	84.79	56.40	49.53	100.00	100.00	47.60	-51.51	-3.26	Inf	1.87	Inf	0.25	0.14	0.07	0.00	0.09	0.13	0.14
60	66.67	100.00	87.51	56.42	52.55	100.00	100.00	51.87	-53.24	8.71	Inf	2.03	Inf	0.28	0.17	0.09	0.00	0.10	0.16	0.15
62	61.29	100.00	10.27	43.10	54.72	100.00	100.00	55.96	-53.51	20.74	Inf	2.17	Inf	0.29	0.20	0.10	0.00	0.10	0.18	0.15
64	43.75	0.00	8.49	43.40	56.24	100.00	100.00	58.37	-54.18	28.63	Inf	2.35	Inf	0.31	0.22	0.12	0.00	0.10	0.20	0.16
66	48.49	0.00	6.99	42.90	57.24	100.00	100.00	61.39	-53.36	37.18	Inf	2.49	Inf	0.32	0.24	0.13	0.00	0.10	0.22	0.16
68	52.94	0.00	94.23	56.56	57.84	100.00	100.00	62.65	-53.39	42.05	Inf	2.71	Inf	0.34	0.26	0.14	0.00	0.10	0.23	0.16
70	57.14	0.00	95.25	55.87	58.04	100.00	100.00	63.38	-53.15	45.89	Inf	2.96	Inf	0.35	0.28	0.16	0.00	0.10	0.24	0.17
72	61.11	0.00	96.13	56.18	57.91	100.00	100.00	65.10	-51.50	50.63	Inf	3.16	Inf	0.36	0.30	0.16	0.00	0.09	0.25	0.16
74	35.14	100.00	96.86	54.61	57.43	100.00	100.00	64.07	-51.48	51.32	Inf	3.56	Inf	0.38	0.31	0.18	0.00	0.09	0.25	0.16
76	68.42	0.00	2.51	45.30	56.65	100.00	100.00	64.98	-49.39	53.99	Inf	3.86	Inf	0.38	0.32	0.18	0.00	0.09	0.25	0.16
78	28.21	100.00	2.02	45.94	55.51	100.00	100.00	64.87	-47.49	54.85	Inf	4.26	Inf	0.39	0.32	0.19	0.00	0.09	0.25	0.15
80	75.00	0.00	1.58	46.12	54.07	100.00	100.00	64.94	-45.02	55.54	Inf	4.70	Inf	0.39	0.32	0.19	0.00	0.08	0.24	0.14
82	21.95	100.00	98.79	53.80	52.31	100.00	100.00	64.86	-42.18	55.58	Inf	5.22	Inf	0.39	0.32	0.19	0.00	0.07	0.23	0.13
84	19.05	100.00	0.91	46.56	50.12	100.00	100.00	64.13	-39.16	54.53	Inf	5.90	Inf	0.39	0.31	0.19	0.00	0.07	0.22	0.12
86	83.72	0.00	99.38	53.18	47.53	100.00	100.00	62.83	-35.95	52.72	Inf	7.09	Inf	0.39	0.30	0.18	0.00	0.06	0.20	0.11
88	86.36	0.00	0.47	48.55	44.43	100.00	100.00	60.07	-32.85	48.65	Inf	8.26	Inf	0.39	0.29	0.18	0.00	0.05	0.18	0.10
90	11.11	100.00	99.69	51.39	40.80	100.00	100.00	58.39	-28.50	45.21	Inf	9.90	Inf	0.39	0.27	0.17	0.00	0.05	0.16	0.09
92	8.70	100.00	99.81	50.86	36.41	100.00	100.00	55.40	-23.93	40.09	Inf	12.50	Inf	0.38	0.24	0.15	0.00	0.04	0.13	0.07
94	93.59	0.00	99.87	50.32	31.08	100.00	100.00	51.56	-18.73	33.61	Inf	13.78	Inf	0.37	0.21	0.13	0.00	0.03	0.11	0.06
96	95.83	0.00	99.97	51.12	24.51	100.00	100.00	45.94	-13.06	25.89	Inf	34.24	Inf	0.35	0.16	0.10	0.00	0.02	0.07	0.04
98	2.04	100.00	99.99	51.80	15.61	100.00	100.00	36.36	-6.69	15.12	Inf	48.85	Inf	0.32	0.10	0.06	0.00	0.01	0.04	0.02
99.5	0.50	100.00	0.00	50.21	5.81	0.00	0.00	18.27	-1.82	4.07	Inf	Inf	Inf	Inf	0.04	0.02	0.00	0.00	0.01	0.00

Table S10. Information gain (prefers Q_1) vs. impact (prefers Q_2)

P(c_1)	Feature probabilities				DStr	Preference strengths of each norm					Usefulness of Q_1 and Q_2, respectively, as calculated by each norm									
	P(q_1|c_1)	P(q_1|c_2)	P(q_2|c_1)	P(q_2|c_2)		Diagn.	Log d.	I. gain	P. gain	Impact	Diagnosticity		Log diagn.		Info. gain		Prob. gain		Impact	
50%	67.72	100.00	28.80	71.26	36.64	100.00	100.00	39.16	-31.13	-34.28	Inf	2.48	Inf	0.39	0.18	0.13	0.16	0.21	0.16	0.21
52	100.00	66.99	71.34	28.12	37.24	100.00	100.00	40.41	-23.91	-34.31	Inf	2.52	Inf	0.40	0.19	0.14	0.16	0.20	0.16	0.22
54	0.00	33.11	28.66	72.41	37.77	100.00	100.00	40.38	-17.25	-35.31	Inf	2.56	Inf	0.41	0.19	0.14	0.15	0.18	0.16	0.22
56	0.00	33.28	28.65	72.97	38.23	100.00	100.00	40.43	-9.67	-36.15	Inf	2.60	Inf	0.41	0.20	0.14	0.15	0.16	0.16	0.22
58	0.00	34.06	28.52	73.67	38.64	100.00	100.00	41.54	-0.71	-35.94	Inf	2.65	Inf	0.42	0.20	0.15	0.14	0.14	0.17	0.22
60	100.00	65.60	71.53	25.70	38.98	100.00	100.00	41.76	7.81	-36.39	Inf	2.70	Inf	0.43	0.21	0.15	0.14	0.13	0.17	0.22
62	100.00	64.87	28.35	75.03	39.26	100.00	100.00	42.64	16.14	-36.16	Inf	2.77	Inf	0.44	0.21	0.15	0.13	0.11	0.17	0.22
64	100.00	64.45	71.73	24.28	39.46	100.00	100.00	42.81	23.22	-36.37	Inf	2.83	Inf	0.45	0.21	0.16	0.13	0.09	0.16	0.22
66	0.00	36.13	71.85	23.53	39.58	100.00	100.00	43.14	29.96	-36.30	Inf	2.90	Inf	0.46	0.22	0.16	0.12	0.07	0.16	0.22
68	100.00	63.42	71.95	22.79	39.62	100.00	100.00	43.21	36.18	-36.32	Inf	2.98	Inf	0.47	0.22	0.16	0.12	0.06	0.16	0.21
70	100.00	62.47	27.70	77.91	39.57	100.00	100.00	44.08	41.96	-35.52	Inf	3.08	Inf	0.49	0.22	0.16	0.11	0.04	0.16	0.21
72	0.00	38.07	72.27	21.10	39.43	100.00	100.00	44.05	47.50	-35.29	Inf	3.18	Inf	0.50	0.22	0.16	0.11	0.02	0.15	0.21
74	0.00	38.75	72.45	20.22	39.19	100.00	100.00	44.13	52.37	-34.79	Inf	3.30	Inf	0.52	0.22	0.16	0.10	0.00	0.15	0.20
76	0.00	40.05	27.32	80.86	38.82	100.00	100.00	45.13	51.96	-33.38	Inf	3.46	Inf	0.54	0.22	0.16	0.10	0.00	0.15	0.20
78	0.00	40.24	27.13	81.68	38.33	100.00	100.00	44.08	48.88	-33.33	Inf	3.60	Inf	0.55	0.22	0.16	0.09	0.00	0.14	0.19
80	100.00	58.88	73.13	17.29	37.66	100.00	100.00	44.03	46.14	-32.21	Inf	3.79	Inf	0.57	0.21	0.15	0.08	0.00	0.13	0.18
82	100.00	57.47	73.50	16.11	36.84	100.00	100.00	44.57	43.70	-30.43	Inf	4.05	Inf	0.60	0.21	0.15	0.08	0.00	0.13	0.17
84	100.00	57.32	73.74	15.09	35.82	100.00	100.00	42.87	39.84	-29.92	Inf	4.30	Inf	0.63	0.20	0.14	0.07	0.00	0.11	0.16
86	0.00	43.25	25.92	86.08	34.49	100.00	100.00	41.55	36.09	-28.62	Inf	4.63	Inf	0.66	0.19	0.14	0.06	0.00	0.10	0.14
88	100.00	54.94	74.65	12.49	32.88	100.00	100.00	41.72	32.82	-25.91	Inf	5.15	Inf	0.70	0.18	0.13	0.05	0.00	0.10	0.13
90	100.00	53.76	75.23	11.06	30.92	100.00	100.00	40.42	28.70	-23.65	Inf	5.80	Inf	0.75	0.17	0.12	0.05	0.00	0.08	0.12
92	100.00	52.85	75.93	9.57	28.34	100.00	100.00	38.04	24.00	-21.12	Inf	6.71	Inf	0.80	0.15	0.10	0.04	0.00	0.07	0.10
94	100.00	51.05	76.90	7.77	25.02	100.00	100.00	35.89	19.17	-17.44	Inf	8.29	Inf	0.89	0.13	0.09	0.03	0.00	0.06	0.08
96	100.00	49.28	78.24	5.79	20.47	100.00	100.00	32.03	13.71	-13.08	Inf	11.25	Inf	1.01	0.10	0.07	0.02	0.00	0.04	0.06
98	100.00	47.38	19.61	96.46	13.92	100.00	100.00	25.01	7.31	-7.75	Inf	18.95	Inf	1.22	0.06	0.04	0.01	0.00	0.02	0.03
99.5	0.00	54.84	15.95	98.86	5.59	100.00	100.00	13.30	1.98	-2.35	Inf	62.68	Inf	1.69	0.02	0.01	0.00	0.00	0.01	0.01

Table S11. Impact (prefers Q_1) vs. probability gain (prefers Q_2)

P(c_1)	Feature probabilities				DStr	Preference strengths of each norm					Usefulness of Q_1 and Q_2, respectively, calculated by each norm									
	P(q_1|c_1)	P(q_1|c_2)	P(q_2|c_1)	P(q_2|c_2)		Diagn.	Log d.	I. gain	P. gain	Impact	Diagnosticity		Log diagn.		Info. gain		Prob. gain		Impact	
50.5%	1.98	0.00	0.07	1.19	3.78	100.00	100.00	8.81	-3.97	3.60	Inf	1.11	Inf	0.01	0.01	0.00	0.00	0.01	0.01	0.01
52	7.77	0.06	0.00	3.96	13.67	-100.00	-100.00	19.40	-12.84	14.56	6.31	Inf	0.12	Inf	0.04	0.02	0.00	0.02	0.04	0.02
54	14.82	0.00	0.00	7.80	24.06	0.00	0.00	31.17	-22.96	25.20	Inf	Inf	Inf	Inf	0.08	0.04	0.00	0.04	0.07	0.04
56	78.57	100.00	100.00	89.00	32.11	0.00	0.00	39.31	-29.86	34.53	Inf	Inf	Inf	Inf	0.11	0.06	0.00	0.05	0.11	0.05
58	27.59	0.00	0.00	14.34	38.46	0.00	0.00	44.60	-35.94	41.15	Inf	Inf	Inf	Inf	0.14	0.08	0.00	0.06	0.13	0.07
60	33.33	0.00	0.00	17.27	43.49	0.00	0.00	49.13	-40.20	47.03	Inf	Inf	Inf	Inf	0.17	0.10	0.00	0.07	0.16	0.08
62	38.71	0.00	0.00	20.47	47.46	0.00	0.00	51.72	-44.25	50.89	Inf	Inf	Inf	Inf	0.20	0.12	0.00	0.08	0.18	0.10
64	43.75	0.00	0.00	23.23	50.46	0.00	0.00	54.16	-46.79	54.41	Inf	Inf	Inf	Inf	0.22	0.13	0.00	0.08	0.20	0.11
66	51.52	100.00	100.00	73.62	52.69	0.00	0.00	55.10	-49.40	56.18	Inf	Inf	Inf	Inf	0.24	0.15	0.00	0.09	0.22	0.12
68	47.06	100.00	100.00	71.99	54.29	0.00	0.00	58.10	-49.38	59.68	Inf	Inf	Inf	Inf	0.26	0.16	0.00	0.09	0.23	0.12
70	57.14	0.00	100.00	69.66	55.25	0.00	0.00	59.21	-49.93	61.12	Inf	Inf	Inf	Inf	0.28	0.17	0.00	0.09	0.24	0.13
72	38.88	99.99	0.00	33.85	55.66	-100.00	-100.00	57.67	-51.46	60.19	2691.28	Inf	1.90	Inf	0.30	0.19	0.00	0.09	0.25	0.14
74	64.86	0.00	0.00	34.82	55.59	0.00	0.00	60.22	-49.74	62.12	Inf	Inf	Inf	Inf	0.31	0.20	0.00	0.09	0.25	0.13
76	31.58	100.00	100.00	62.33	55.06	0.00	0.00	59.08	-49.70	60.98	Inf	Inf	Inf	Inf	0.32	0.21	0.00	0.09	0.25	0.14
78	28.21	100.00	100.00	60.90	54.00	0.00	0.00	59.85	-47.81	60.99	Inf	Inf	Inf	Inf	0.32	0.21	0.00	0.09	0.25	0.13
80	25.00	100.00	0.00	40.66	52.48	0.00	0.00	59.99	-45.77	60.18	Inf	Inf	Inf	Inf	0.32	0.21	0.00	0.08	0.24	0.13
82	21.95	100.00	100.00	57.98	50.49	0.00	0.00	60.02	-43.29	58.89	Inf	Inf	Inf	Inf	0.32	0.21	0.00	0.08	0.23	0.12
84	19.05	100.00	100.00	54.66	47.93	0.00	0.00	56.71	-41.87	54.87	Inf	Inf	Inf	Inf	0.31	0.22	0.00	0.07	0.22	0.12
86	83.72	0.00	0.00	45.49	44.86	0.00	0.00	57.70	-37.67	53.43	Inf	Inf	Inf	Inf	0.30	0.20	0.00	0.06	0.20	0.11
88	86.36	0.00	0.00	46.94	41.15	0.00	0.00	56.22	-34.05	49.73	Inf	Inf	Inf	Inf	0.29	0.19	0.00	0.06	0.18	0.10
90	88.89	0.00	0.00	47.59	36.71	0.00	0.00	55.25	-29.44	45.78	Inf	Inf	Inf	Inf	0.27	0.18	0.00	0.05	0.16	0.09
92	8.70	100.00	100.00	49.13	31.56	0.00	0.00	50.10	-25.71	38.73	Inf	Inf	Inf	Inf	0.24	0.17	0.00	0.04	0.13	0.07
94	93.62	0.00	100.00	49.57	25.56	0.00	0.00	48.28	-19.71	33.11	Inf	Inf	Inf	Inf	0.21	0.14	0.00	0.03	0.11	0.06
96	95.83	0.00	0.00	50.38	18.55	0.00	0.00	43.67	-13.64	25.22	Inf	Inf	Inf	Inf	0.16	0.10	0.00	0.02	0.07	0.04
98	97.96	0.00	100.00	51.17	10.12	0.00	0.00	35.54	-6.84	14.97	Inf	Inf	Inf	Inf	0.10	0.06	0.00	0.01	0.04	0.02
99.5	0.50	100.00	0.00	45.82	2.75	0.00	0.00	19.70	-1.68	4.44	Inf	Inf	Inf	Inf	0.04	0.02	0.00	0.00	0.01	0.00

Note. This table begins with P(c_1)=0.505, because if P(c_1)=P(c_2)=0.5, impact and probability gain are identical.