Crying Wolf in the Lab

Arya Gaduh, Peter McGee, Alexander Ugarov*

July 29, 2022

Abstract

Keywords:

1 Introduction

A Tables

Table 1: List of Treatments

	Gremlins composition				
Prop. of black balls (p)	Honest	Black-eyed	White-eyed	FP rate	FN rate
0.1,0.2,0.3,0.5	2	0	0	0	0
0.1,0.2,0.3,0.5	3	1	0	0.333	0
0.1,0.2,0.3,0.5	3	0	1	0	0.333
0.1,0.2,0.3,0.5	3	1	1 0	0.333	0.333
0.1,0.2,0.3,0.5	5	1	0	0.2	0
0.1,0.2,0.3,0.5	5	0	1	0	0.2
0.1,0.2,0.3,0.5	5	1	1	0.2	0.2

Table 2: Demographic Characteristics of Subjects

	All		$p \in \{0.1, 0.3\}$		$p \in \{0.2, 0.5\}$	
	N	%	N	%	N	%
Male	43	41	22	41	21	41
Age>23yrs old	14	13	6	11	8	16
Students	88	84	46	85	42	82
Had statistics classes	63	60	37	69	26	51
Total	105	100	54	100	51	100

Table 3: Risk Aversion Measurement

Switching Probability (π^*)	θ	N
Always protect	>2	1
0.1	2	10
0.15	1.216	13
0.2	0.573	29
0.25	0	16
0.3	-0.539	15
Never protect	<-0.539	14

Table 4: WTP for Information (Discrepancy)

	(1)	(2)	(3)	(4)
FP costs	.251*	.273	.404**	.317
	(0.1)	(0.3)	(0.2)	(0.5)
FN costs	.356***	.244	.425***	.00264
	(0.1)	(0.3)	(0.1)	(0.3)
Risk-averse		.0696		
		(0.5)		
Risk-averse × FP costs		.0128		
		(0.4)		
FP costs		0		
		(.)		
Risk-averse × FN costs		.0869		
		(0.3)		
FN costs		0		
		(.)		
Risk loving		.108		
		(0.6)		
Risk loving × FP costs		-.255		
		(0.4)		
FP costs		0		
		(.)		
Risk loving × FN costs		.229		
		(0.3)		
FN costs		0		
		(.)		
No risk av. measure		.131		
		(0.8)		
No risk av. measure × FP costs		.346		
		(0.5)		
No risk av. measure × FN costs		.0625		
		(0.3)		
Accur. beliefs			.212	
			(0.3)	
Accur. beliefs × FP costs			-.361	
			(0.2)	
Accur. beliefs × FN costs			-.143	
			(0.1)	
Inaccurate beliefs × Risk-loving				-.088
				(0.8)
Inaccurate beliefs × Risk-averse				-.29
				(0.7)
Inaccurate beliefs × No risk av. measure				.827
				(1.2)
Inaccurate beliefs × Risk-loving × FP costs				-.155
				(0.6)
Inaccurate beliefs × Risk-averse × FP costs				.258
				(0.6)
Inaccurate beliefs × No risk av. measure × FP costs				-.297
				(0.7)
Inaccurate beliefs × Risk-loving × FN costs				.502
				(0.3)
Inaccurate beliefs × Risk-averse × FN costs				.358
				(0.3)
Inaccurate beliefs × No risk av. measure × FN costs				.355
				(0.4)
Constant	-.233	-.302	-.331	-.151
	(0.2)	(0.5)	(0.2)	(0.6)
Observations	630	630	630	630
Adjusted R^2	0.05	0.04	0.05	0.04

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: WTP for Information (Discrepancy)

	(1)	(2)	(3)	(4)
FP costs	.251*	.273	.404**	.317
	(0.1)	(0.3)	(0.2)	(0.5)
FN costs	.356***	.244	.425***	.00264
	(0.1)	(0.3)	(0.1)	(0.3)
Risk-averse		.0696		
		(0.5)		
Risk-averse × FP costs		.0128		
		(0.4)		
FP costs		0		
		(.)		
Risk-averse × FN costs		.0869		
		(0.3)		
FN costs		0		
		(.)		
Risk loving		.108		
		(0.6)		
Risk loving × FP costs		-.255		
		(0.4)		
FP costs		0		
		(.)		
Risk loving × FN costs		.229		
		(0.3)		
FN costs		0		
		(.)		
No risk av. measure		.131		
		(0.8)		
No risk av. measure × FP costs		.346		
		(0.5)		
No risk av. measure × FN costs		.0625		
		(0.3)		
Accur. beliefs			.212	
			(0.3)	
Accur. beliefs × FP costs			-.361	
			(0.2)	
Accur. beliefs × FN costs			-.143	
			(0.1)	
Constant	-.233	-.302	-.331	-.151
	(0.2)	(0.5)	(0.2)	(0.6)
Observations	630	630	630	630
Adjusted R^2	0.05	0.04	0.05	0.04

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: WTP for Information (Discrepancy, by prior)

	(1)	(2)	(3)	(4)	(5)
	All	0.1	0.2	0.3	0.5
FP rate	.99**	2.12***	2.34***	.287	-.816
	(0.5)	(0.7)	(0.7)	(0.8)	(0.9)
FN rate	1.2***	-1.22**	.768	1.56**	3.79***
	(0.4)	(0.5)	(0.5)	(0.6)	(0.7)
Constant	-.154	.412*	-.715***	-.968***	.671**
	(0.2)	(0.2)	(0.2)	(0.2)	(0.3)
Observations	630	162	153	162	153
Adjusted R^2	0.02	0.04	0.05	0.01	0.09

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Informed protection by prior

	(1)	(2)	(3)	(4)	(5)	(6)
Informed protection						
False pos. rate	2.05***	2.83***	3.25***	4.61***	1.74***	2.72***
	(0.4)	(0.6)	(0.7)	(1.0)	(0.5)	(0.7)
False neg. rate	2.15***	2.66***	1.4***	1.84***	3.66***	4.78***
	(0.3)	(0.4)	(0.5)	(0.6)	(0.4)	(0.6)
p>0.2			.335**	.632***		
			(0.2)	(0.2)		
p>0.2 × False pos. rate			-1.49**	-2.06**		
			(0.7)	(0.9)		
p>0.2 × False neg. rate			1.12**	1.28*		
			(0.6)	(0.7)		
Gremlin says Black=1					1.04**	1.62***
					(0.5)	(0.6)
Gremlin says Black=1 × False pos. rate					.376	-.144
					(1.3)	(1.8)
Gremlin says Black=1 × False neg. rate					-3.32***	-4.49***
					(0.7)	(0.8)
Constant	-1.29***	.529***	-1.56***	-.136	-1.48***	.368***
	(0.1)	(0.0)	(0.2)	(0.2)	(0.1)	(0.1)
Subject FE	No	Yes	No	Yes	No	Yes
Observations	1259	1235	1259	1235	1259	1235
Adjusted R^2						

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Model	**Prediction**
Strict risk-aversion EU	Higher sensitivity to FN rates
Strict risk-aversion EU+prudence	Ratio of FN to FP sensitivities ↑ with π
Loss aversion	FP sensit. ↓ with π FP sensit. is lower than for risk-neutral (RN)
Probability weighting	FP sensit.>RN for low π FP sensit.<RN for high π FN sensit. is higher than RN for $\pi P(W\|B) < P(S = B) < 1/2$
Probability estimation bias	FP sensitivity decreases with π rel. to RN FN sensitivity increases with π rel. to RN Diff. WTP for treatments with eq. FP and FN frequencies

Table 8: WTP: demographic characteristic interaction of priors and signal characteristics

	(1) All	(2) Good quiz only	(3) Stat. classes
model			
p>0.2	1.02***	.918***	.999***
	(0.3)	(0.3)	(0.3)
FP rate	-2.83**	-3.23**	-2.07
	(1.1)	(1.4)	(1.3)
p>0.2 × FP rate	-.374	-.982	-.962
	(1.3)	(1.6)	(1.6)
FN rate	-2.45**	-3.8***	-2.24*
	(1.1)	(1.3)	(1.3)
p>0.2 × FN rate	-.874	-.373	-.797
	(1.3)	(1.5)	(1.6)
Constant	1.72***	2.11***	1.56***
	(0.2)	(0.3)	(0.3)
sigma			
Constant	1.9***	1.61***	1.82***
	(0.1)	(0.1)	(0.1)
Observations	630	342	378
Adjusted R^2			

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: WTP: testing for interaction of priors and signal characteristics

	(1)	(2)	(3)
model			
p>0.2	1.02***	1.07***	.871*
	(0.3)	(0.4)	(0.5)
FP rate	-2.83**	-2.33	-4.37**
	(1.1)	(1.6)	(2.0)
p>0.2 × FP rate	-.374	.49	.889
	(1.3)	(1.9)	(2.2)
FN rate	-2.45**	-.728	-2.86
	(1.1)	(1.7)	(1.9)
p>0.2 × FN rate	-.874	-1.41	-.75
	(1.3)	(1.9)	(2.2)
Good quiz		.858*	
		(0.5)	
Good quiz × p>0.2		-.126	
		(0.5)	
Good quiz × FP rate		-1.08	
		(2.3)	
Good quiz × p>0.2 × FP rate		-1.47	
		(2.6)	
Good quiz × FN rate		-3.25	
		(2.3)	
Good quiz × p>0.2 × FN rate		1.06	
		(2.6)	
Stat. class			-.564
			(0.5)
Stat. class × p>0.2			.143
			(0.6)
Stat. class × FP rate			2.27
			(2.4)
Stat. class × p>0.2 × FP rate			-1.86
			(2.7)
Stat. class × FN rate			.622
			(2.4)
Stat. class × p>0.2 × FN rate			-.0703
			(2.7)
Constant	1.72***	1.26***	2.11***
	(0.2)	(0.3)	(0.4)
sigma			
Constant	1.9***	1.88***	1.9***
	(0.1)	(0.1)	(0.1)
Observations	630	630	630
Adjusted R^2			

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10: WTP: extra effect of prior probability

	(1)	(2)	(3)	(4)
model				
FP rate	-4.43	-5.88*	-4.76*	-6.17*
	(2.8)	(3.3)	(2.8)	(3.3)
FN rate	-2.35**	-1	-2.7*	-1.46
	(1.2)	(1.6)	(1.4)	(1.8)
Stat. class			-.441*	-.436*
			(0.2)	(0.2)
Stat. class × FP rate			.809	.762
			(1.1)	(1.1)
Stat. class × FN rate			.568	.609
			(1.1)	(1.1)
Constant	1.46***	1.25***	1.77***	1.55***
	(0.2)	(0.4)	(0.3)	(0.4)
sigma				
Constant	1.88***	1.88***	1.87***	1.87***
	(0.1)	(0.1)	(0.1)	(0.1)
With squares	No	Yes	No	Yes
Observations	630	630	630	630
Adjusted R^2				

Controlling for priors and total probabilities of false-posiive and false-negative outcomes. Standard errors in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11: Belief updating: evidence of signal and base rate neglect

	(1) OLS	(2) FE	(3) OLS	(4) FE	(5) OLS	(6) FE
Prior	.246***	.202***	.175***	.191**	.14**	.0403
	(5.5)	(4.0)	(3.1)	(2.5)	(2.3)	(0.6)
Signal	.43***	.43***	.327***	.327***	.539***	.539***
	(6.3)	(6.3)	(3.2)	(3.2)	(5.3)	(5.3)
Good quiz × Prior			.143*	.0207		
			(1.7)	(0.2)		
Good quiz × Signal			.193	.193		
			(1.4)	(1.4)		
Stat. class × Prior					.162*	.264***
					(1.9)	(2.8)
Stat. class × Signal					-.166	-.166
					(-1.2)	(-1.2)
Observations	280	280	280	280	280	280
Adjusted R^2	0.31	0.31	0.33	0.32	0.32	0.32

Decomposition works only for imperfect signals

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

B Figures

Figure 1: Average Blind Protection Response

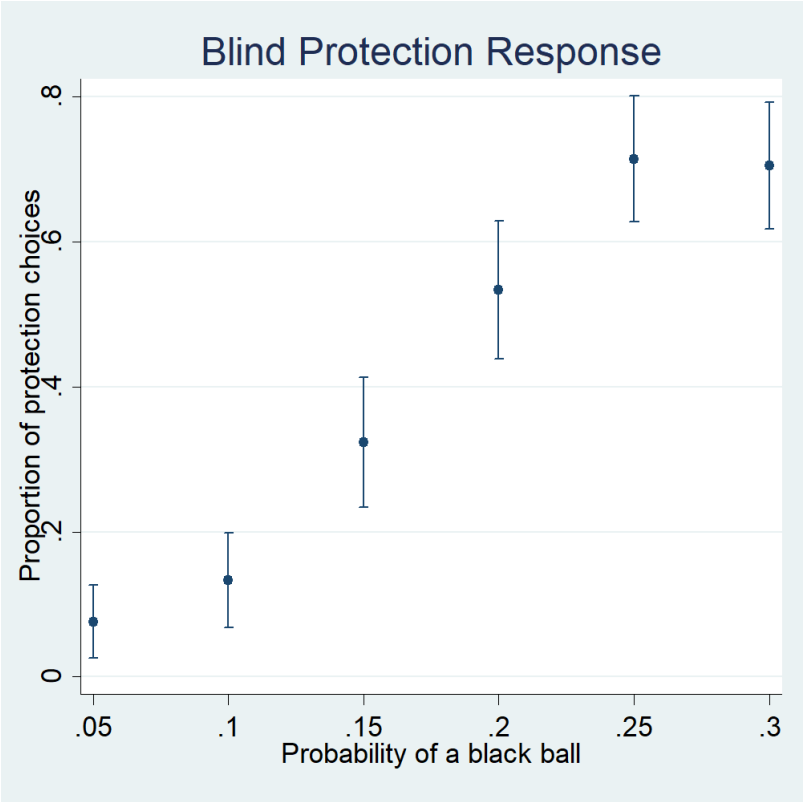


Figure 2: Average Informed Protection Response

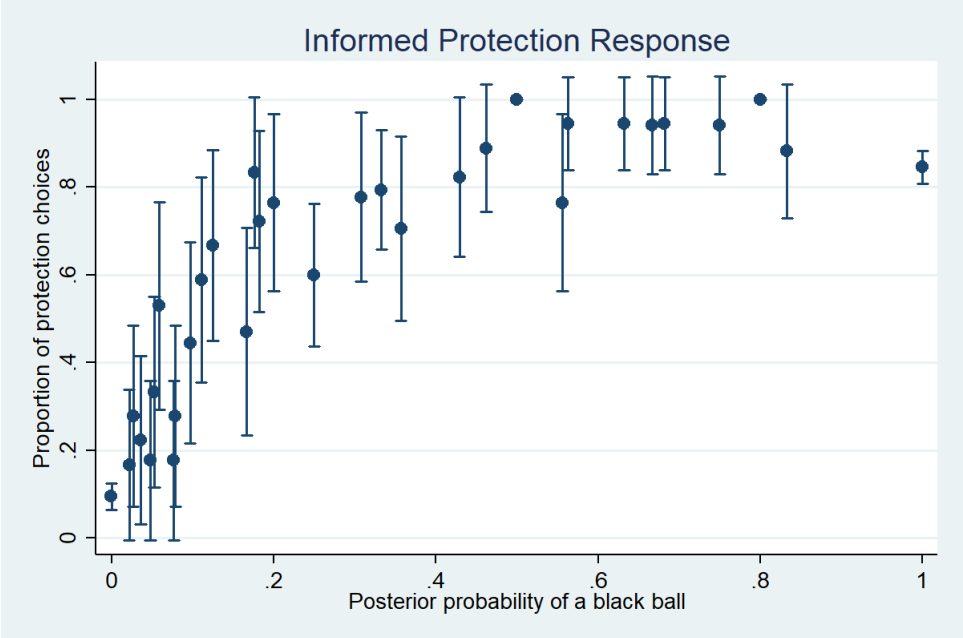


Figure 3: Average Informed Protection Response

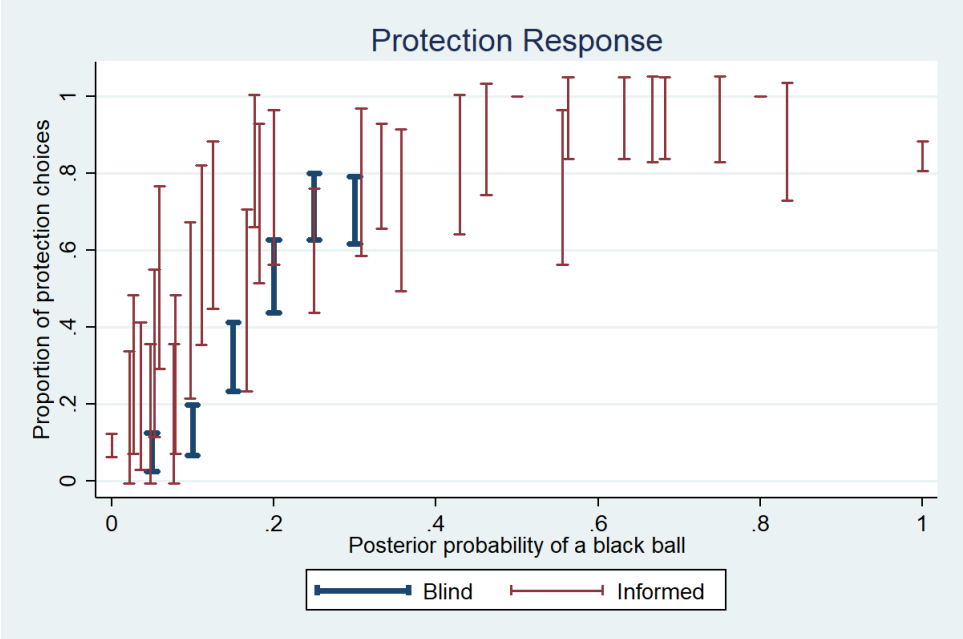


Figure 4: Average Informed Protection Response (Smoothed)

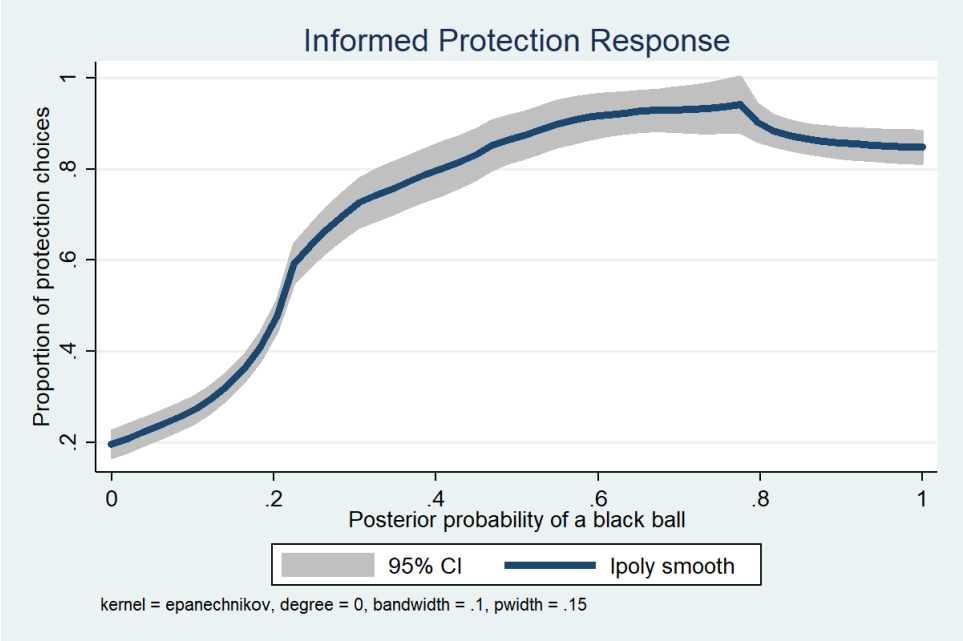


Figure 5: Belief Updating

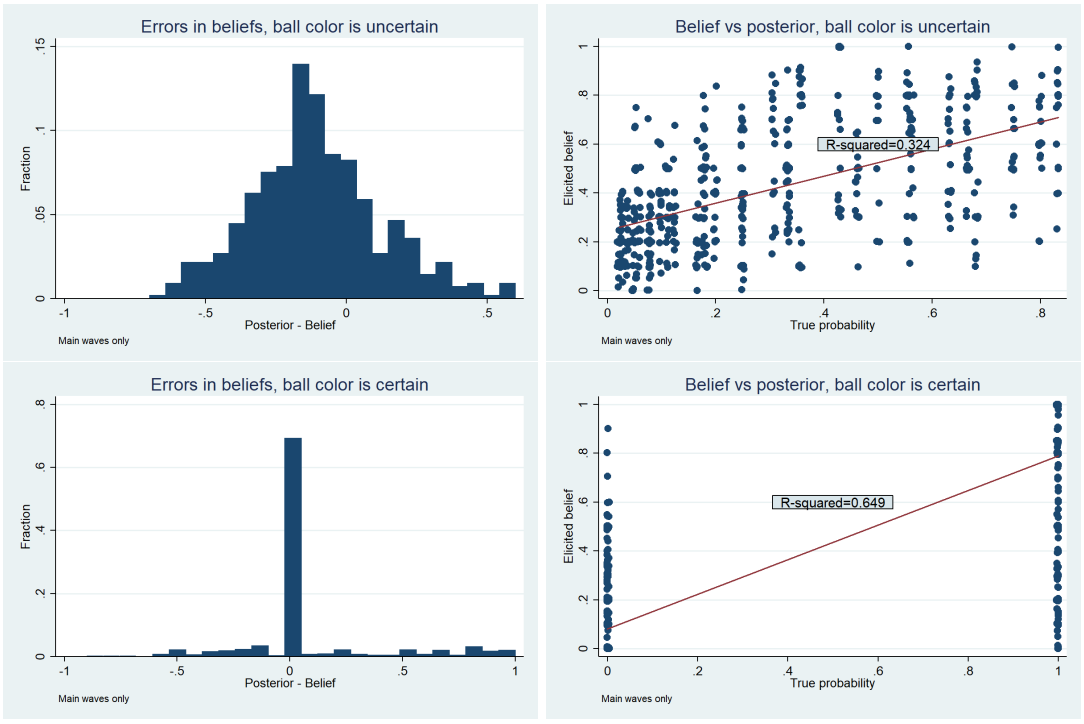


Figure 6: Theoretical vs actual WTP

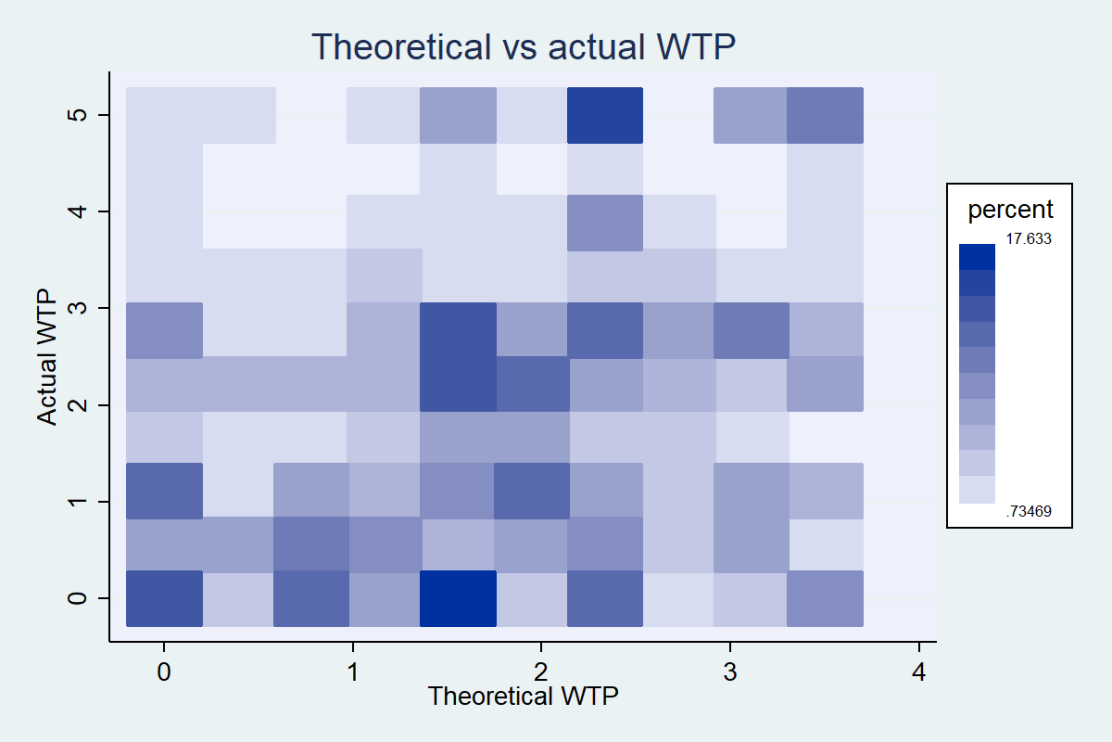


Figure 7: WTP discrepancy

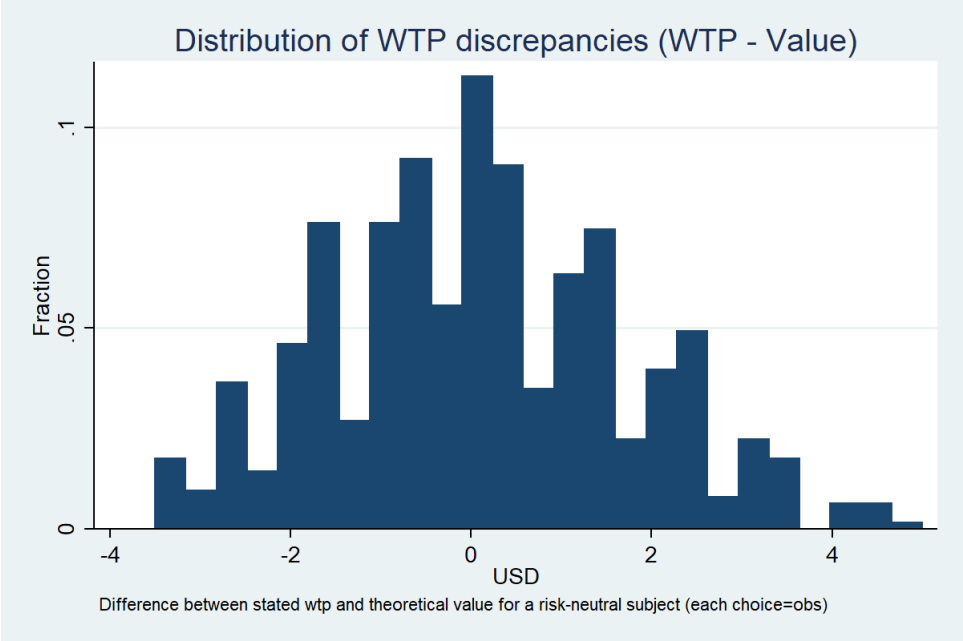
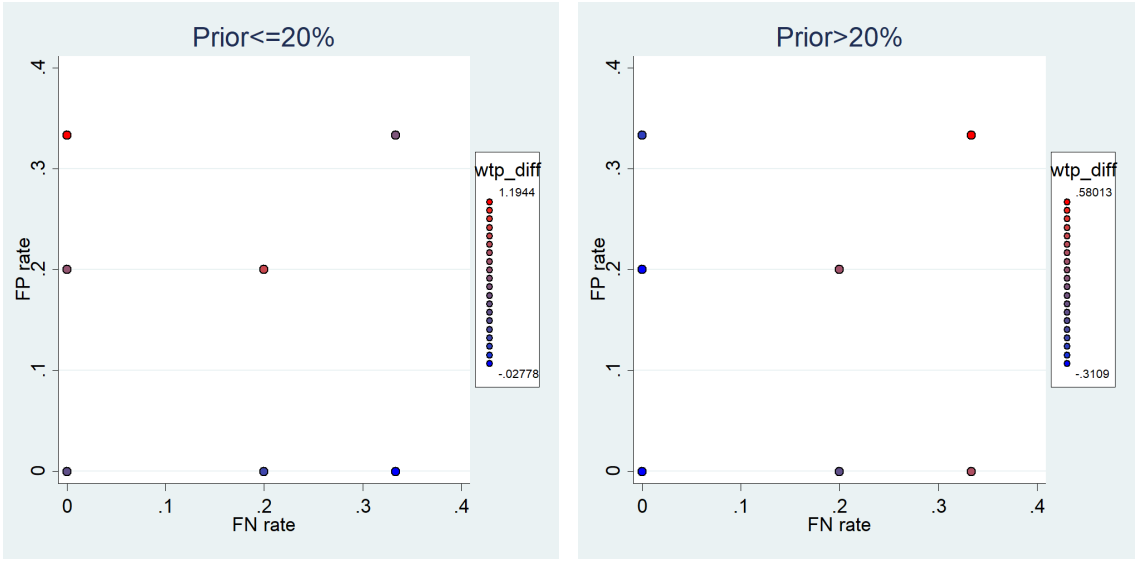


Figure 8: WTP discrepancy by prior and signal characteristics



C Appendix Tables

Table 12: Belief Elicitation: Discrepancy

	(1)	(2)	(3)	(4)	(5)	(6)
False neg. rate	-.0101	-.0101	.05	.05	.0886	.0876
	(0.0)	(0.0)	(0.1)	(0.1)	(0.1)	(0.1)
False pos. rate	-.606***	-.606***	-.75***	-.749***	-.664***	-.66***
	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Good quiz			-.0299	-.0538		
			(0.0)	(0.0)		
Good quiz × False neg. rate			-.102	-.102		
			(0.1)	(0.1)		
Good quiz × False pos. rate			.269**	.266**		
			(0.1)	(0.1)		
Stat. class					.0203	.0391
					(0.0)	(0.0)
Stat. class × False neg. rate					-.172*	-.171*
					(0.1)	(0.1)
Stat. class × False pos. rate					.104	.0999
					(0.1)	(0.1)
Constant	.0616***	.0279	.0779***	.0566	.0499**	.00222
	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Prior prob dummies	No	Yes	No	Yes	No	Yes
Observations	1260	1260	1260	1260	1260	1260
Adjusted R^2	0.09	0.09	0.09	0.10	0.09	0.09

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 13: WTP for Information (Discrepancy, demographic variables)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FP costs	.251*	.283	.352*	.117	.215	.263*	.307**	.479**	.515*
	(0.1)	(0.2)	(0.2)	(0.2)	(0.2)	(0.1)	(0.1)	(0.2)	(0.2)
FN costs	.356***	.322***	.247***	.395***	.303***	.307***	.251***	.493***	.453*
	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Male		-.251	-.238						
		(0.3)	(0.4)						
Male × FP costs		-.122	-.159						
		(0.2)	(0.2)						
Male × FN costs		.0857	.117						
		(0.1)	(0.1)						
Stat. class				-.28	-.194				
				(0.3)	(0.4)				
Stat. class × FP costs				.218	.145				
				(0.3)	(0.3)				
Stat. class × FN costs				-.0785	-.0188				
				(0.1)	(0.1)				
>23 yrs						-.335	-.606		
						(0.4)	(0.4)		
>23 yrs × FP costs						-.0837	.00811		
						(0.3)	(0.3)		
>23 yrs × FN costs						.346	.275		
						(0.2)	(0.2)		
Good quiz								.493	.453
								(0.3)	(0.4)
Good quiz × FP costs								-.441*	-.41
								(0.3)	(0.3)
Good quiz × FN costs								-.253*	-.295
								(0.1)	(0.1)
Constant	-.233	-.126	.391	-.0579	.419	-.188	.356	-.5**	.045
	(0.2)	(0.2)	(0.3)	(0.3)	(0.4)	(0.2)	(0.2)	(0.3)	(0.3)
Prior dummies	No	No	Yes	No	Yes	No	Yes	No	Yes
Observations	630	630	630	630	630	630	630	630	630
Adjusted R^2	0.05	0.05	0.21	0.05	0.21	0.05	0.21	0.05	0.22

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$