When Motivated Reasoning Grows

The effect of timing of informativeness

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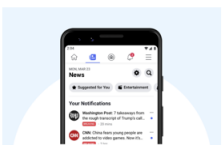
Does the timing of informativeness affect belief updating?

Scenario 1: Informativeness prior to information



Scenario 2: Informativeness following information

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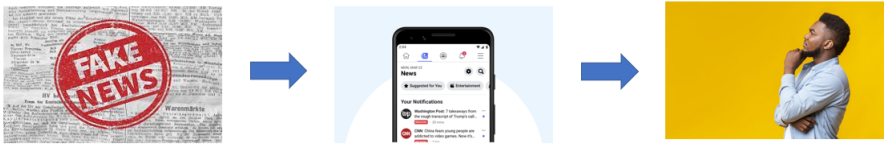

Scenario 2: Informativeness following information

Research questions

1. **How does the timing of informativeness affect information processing?**
   - Informativeness prior to information (e.g., mislearning Kieren & Weber, 2021; Thaler, 2023; anchoring, Tversky & Kahneman 1974; Cervone & Peake 1986; Switzer & Siezek 1991)
   - Informativeness following information (e.g.,the continued influence effect, Ecker et al. 2022; failure of unlearning, Goncalves et al., 2022; Wittrock et al. 2023)

2. **How does the timing of informativeness affect the growth or reduction of motivated reasoning?**
   - Sequential belief updating: primacy effects, recency effects (e.g., Benjamin 2019)
   - *Hypothesis*: Knowing the informativeness prior to information constrains the temptation to interpret information in one's preferred way (e.g., Saccardo and Serra-Garcia 2023)

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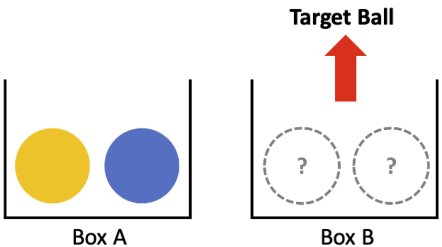
Study 1

Experimental setting



- Box A contains 1 yellow and 1 blue ball
- Box B contains 2 balls, each of which can be yellow or blue with equal probability
- **Target Ball** is drawn from Box B

- **Clue Ball** is drawn from Box A or Box B with equal probability
  - If a Clue Ball is drawn from *Box A*, its color is *uninformative*
  - If a Clue Ball is drawn from *Box B*, its color is *Informative*

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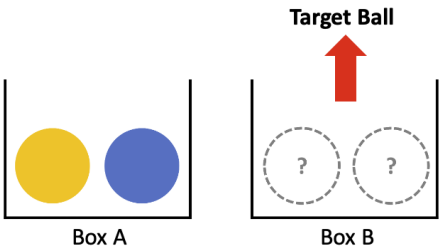

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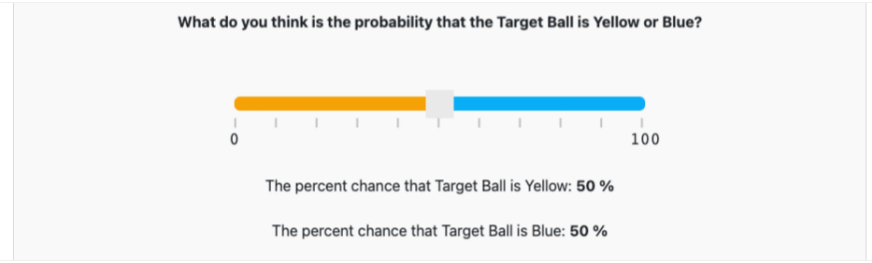
Experimental task

- Subjects guess the color of the **Target ball** three times
- Binarized scoring rule without quantitative information (Danz et al. 2022)



- Before starting the experiment, subjects choose between yellow or blue
  - A higher prize ($2) if the color of the Target ball *matches* a subject's color choice; a lower prize ($0.5) if it does not

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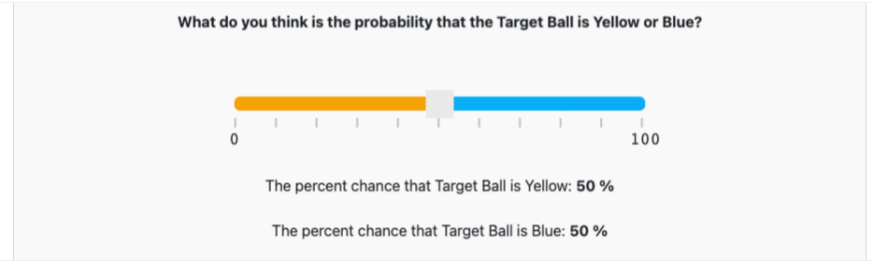

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Box First:	Prior	$\rightarrow$	Informativeness	$\rightarrow$	Interim	$\rightarrow$	Information	$\rightarrow$ Posterior
Color First:	Prior	$\rightarrow$	Information	$\rightarrow$	Interim	$\rightarrow$	Informativeness	$\rightarrow$ Posterior

- Information: the **color** of the Clue Ball
- Informativeness: the **box** from which the Clue Ball is drawn

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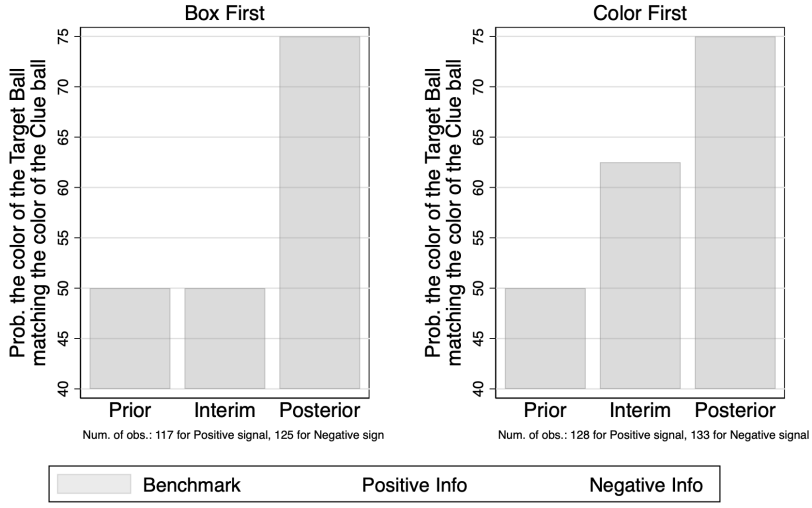
Procedure

- 200 subjects participated through Prolific
- Each subject submits 3 guesses for each round, and there are 5 rounds in total
- A total of 99*5=995 observations for each of *prior, interim and posterior*

Informative Information: when the Clue Ball is from Box B



Note: Error bars represent standard errors. Num. of individuals: 200

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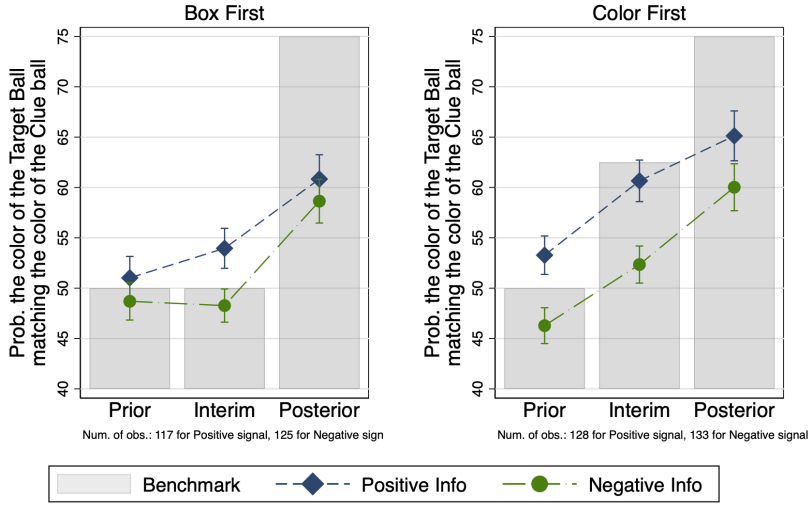

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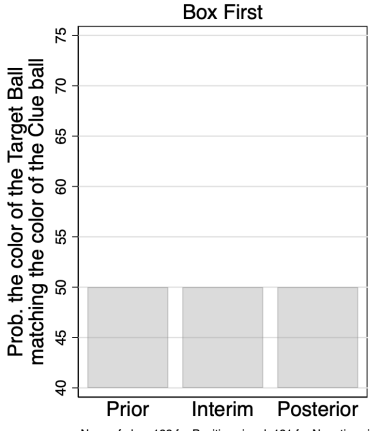
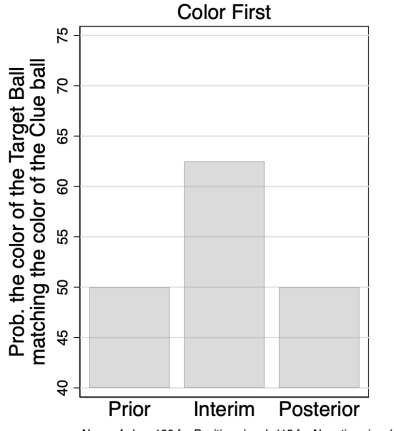
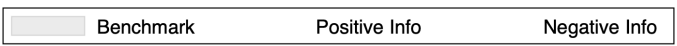
Uninformative Information: when the Clue Ball is from Box A







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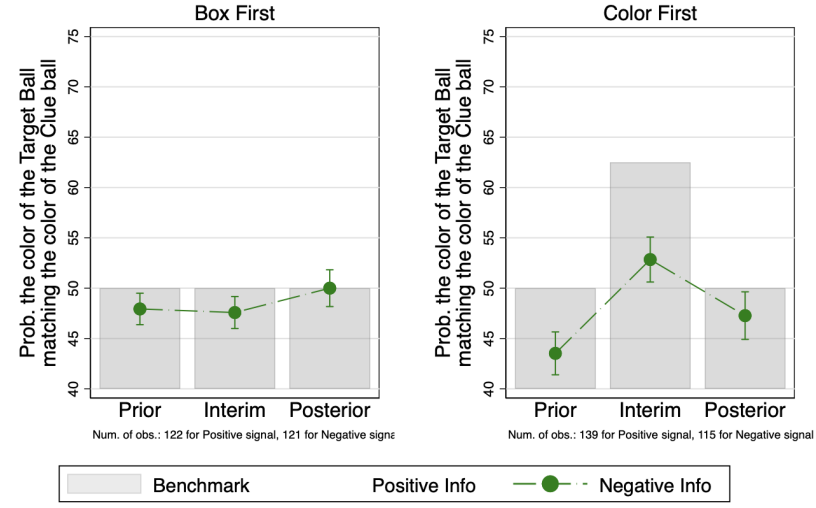
Uninformative Information: when the Clue Ball is from Box A



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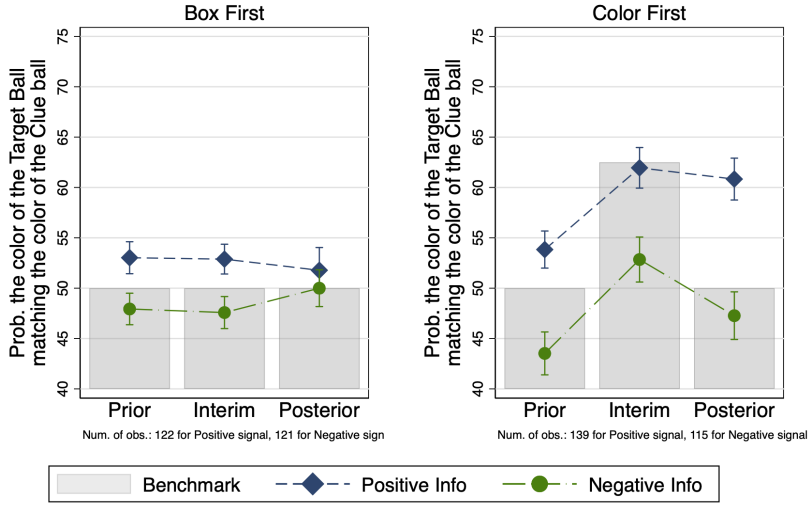

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The timing of **uninformativeness** & Motivated reasoning

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	Informative Information				**Uninformative** information			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Prior	0.420***	0.420***	0.415***	0.420***	0.576***	0.580***	0.559***	0.556***
	(0.090)	(0.090)	(0.090)	(0.090)	(0.075)	(0.074)	(0.074)	(0.073)
Color First		**3.064**		2.398		**4.407***		-0.409
		(2.947)		(3.970)		**(2.475)**		(3.064)
Positive Info			**1.721**	1.220			**3.709***	-0.886
			(2.680)	(3.960)			**(1.961)**	(2.729)
Color First × Positive Info				**0.946**				**8.757****
				(5.420)				**(3.957)**
Constant	42.530***	41.025***	41.939***	38.195***	28.598***	26.003***	27.594***	27.705***
	(5.392)	(5.530)	(5.469)	(5.497)	(4.743)	(4.764)	(4.725)	(4.726)
Total Observations	503	503	503	503	497	497	497	497
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Notes: Clustered standard errors at the subject level in parentheses. * $p < .1$, ** $p < .05$, *** $p < .01$.
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Individuals	194	194	194	194	188	188	188	188

Notes: Clustered standard errors at the subject level in parentheses. * $p < .1$, ** $p < .05$, *** $p < .01$.
All specifications in this table include round dummies.

Study 2

Experimental task

- 7 factual questions in the political domain (Thaler 2023)
- Answer every question three times

(Example) US Crime

This question asks how murder and manslaughter rates changed during the Obama administration. In 2008 (before Obama became president), the murder and manslaughter rate was 54 per million Americans. In 2016 (at the end of Obama's presidency), what was the per-million murder and manslaughter rate?

Answer: 53

List of questions

Factual questions in the political domain

Topic	Pro-Democrat Motives	Pre-Republican Motives
US Crime	Got better under Obama	Got worse under Obama
Upward mobility	Low in US after tax cuts	High in US after tax cuts
Racial discrimination	Severe in labor market	Not severe in labor market
Gender	Girls better at math	Boys better at math
Refugees	Decreased violent crime	Increased violent crime
Climate change	Scientific consensus	No scientific consensus
Gun reform	Decreased homicides	Didn't decrease homicides

Table: The list of topics and hypothesized motives in the experiment (Thaler 2023)

Back

Treatments

Source First:	Prior	→	Informativeness	→	Interim	→	Information	→ Posterior
News First:	Prior	→	Information	→	Interim	→	Informativeness	→ Posterior

- Information: whether the correct answer is **Greater than** or **Less than** their prior
- Informativeness: whether the information is from **Verified** or **Unverified** source
  - True information is always correct
  - Fake information is always false, i.e., the opposite is correct
  - Verified source always generates true information
  - Unverified source generates true or fake information with an equal chance

Treatments

Source First:	Prior	→	Informativeness	→	Interim	→	Information	→ Posterior
News First:	Prior	→	Information	→	Interim	→	Informativeness	→ Posterior

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(Pilot) Data

- N = 128
  - 29 (22.7%) self-identified as Republicans
  - 67 (52.3%) self-identified as Democrats
  - The remaining 25.5% self-identified as Independents
- Data is recoded so that a higher number is considered favorable for Republicans
  - **Greater than** is positive news for Republicans
  - **Less than** is positive news for Democrats
- Data is logged, winsorized at 5%, and then standardized by question

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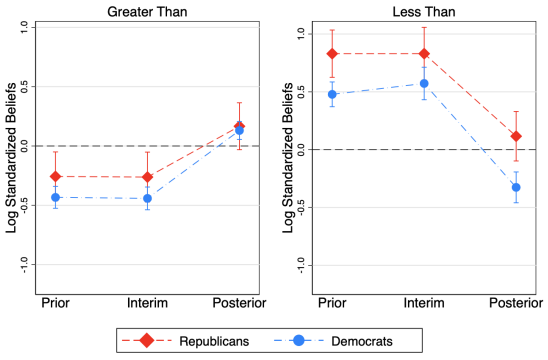
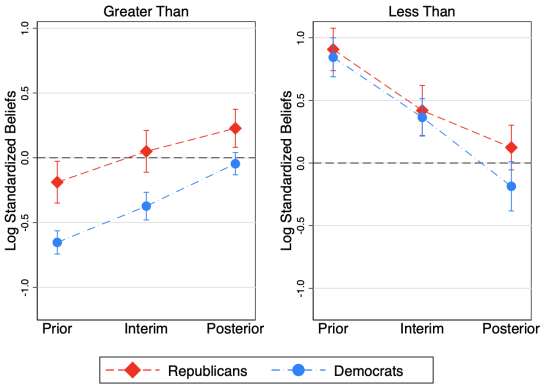
Beliefs react to **Informative** information in the right direction

Verified information (always True)

Source First



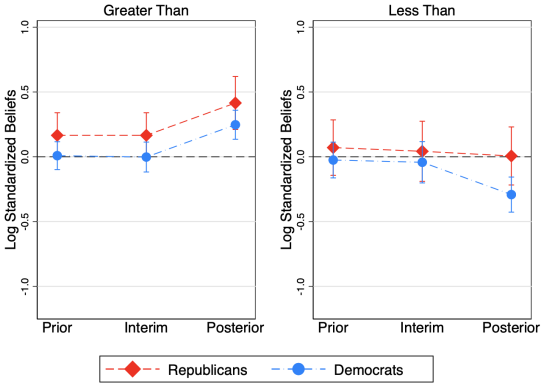
News First



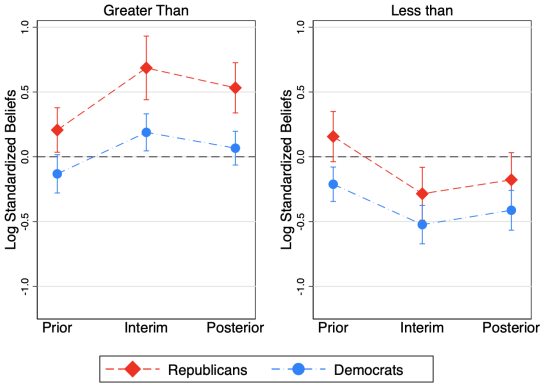
Uninformative information affects beliefs updating

Unverified information (True or Fake with an equal chance)

Source First



News First



The timing of **uninformativeness** & Motivated reasoning

	Dependent Variable: Posterior	
	Informative News	**Uninformative** News
	(1)	(2)
Prior	0.690***	0.883***
	(0.047)	(0.035)
Greater Than	0.801***	0.525***
	(0.120)	(0.121)
Republican	0.103	0.226**
	(0.193)	(0.091)
News First	-0.148	0.066
	(0.192)	(0.120)
Greater Than × News First	0.154	-0.136
	(0.202)	(0.164)
Republican × News First	0.133	-0.348**
	(0.287)	(0.148)
Greater Than × Republican	-0.219	**-0.230**
	(0.254)	**(0.169)**
Greater Than × Republican × News First	-0.102	**0.524****
	(0.333)	**(0.261)**
Constant	-0.618***	-0.341***
	(0.109)	(0.085)
Observations	355	317
Num. of Individuals	96	95

Notes: Clustered standard errors at the subject level in parentheses. * $p < .1$, ** $p < .05$, *** $p < .01$.
All specifications in this table include question dummies.

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Concluding remarks

- We study the effect of the timing of informativeness on strengthening or attenuating of motivated reasoning
- Study 1 provides evidence that learning informativeness later intensifies motivated reasoning in a ball-box setting
- Study 2 extends to a politicized setting, but the findings are inconclusive
  - Small sample size?
  - Are the questions politicized enough?
  - Each answer has a different range of values

Thank you! Please send comments :)

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