Sorting Fact from Fiction when Reasoning is Motivated

Edoardo Cefala [1] Melis Kartal [1] Sylvia Kritzinger [2] Jean-Robert Tyran [2]

[1] *WU Vienna* [2] *University of Vienna*

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In the UK, conspiracy theories have even seeped on to mainstream TV, alarming broadcasters and Ofcom © Neil Hall/EPA/Shutterstock

The Economist explains

What is the "Great Replacement" right-wing conspiracy theory?

And why has it spread to mainstream politics?

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Definition

Motivation

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- The emergence of misinformation is not a completely new phenomenon.

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- However, it is becoming endemic in our digital and increasingly complex environment. Trend

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- The emergence of misinformation is not a completely new phenomenon.
- However, it is becoming endemic in our digital and increasingly complex environment. Trend
- More topics are getting politicised.

POLITICO

MAGAZINE

POLITICS

How Raw Milk Went from a Whole Foods Staple to a Conservative Signal

The poles of American politics have become scrambled. Just look at unpasteurized milk.

Motivation

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- Having wrong information may be costly and lead to suboptimal decisions.

  Economy

Motivation

- Having wrong information may be costly and lead to suboptimal decisions.
  Economy
- Hence, the ability to sort fact from fiction is becoming increasingly important.
  Importance

Research Question

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- What factors explain the ability to sort fact from fiction?

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- What factors explain the ability to sort fact from fiction?
- What factors hinder it?

Preview of the results

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- We show the importance of biases such as **motivated reasoning** and **overconfidence**.

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- We show the importance of biases such as **motivated reasoning** and **overconfidence**.
- We also show how increases in **cognitive ability** (and **education**) may instead improve the ability to sort fact from fiction.

Contribution

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- We show factors contributing to news discernment with a focus on cognitive ability and partisanship. Literature

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- We show factors contributing to news discernment with a focus on cognitive ability and partisanship. Literature
- We show that cognitive ability and education are robust to motivated reasoning.

Survey

Data

- We conducted a survey experiment between June and November 2023 in three different countries: Austria, Germany and UK. Table

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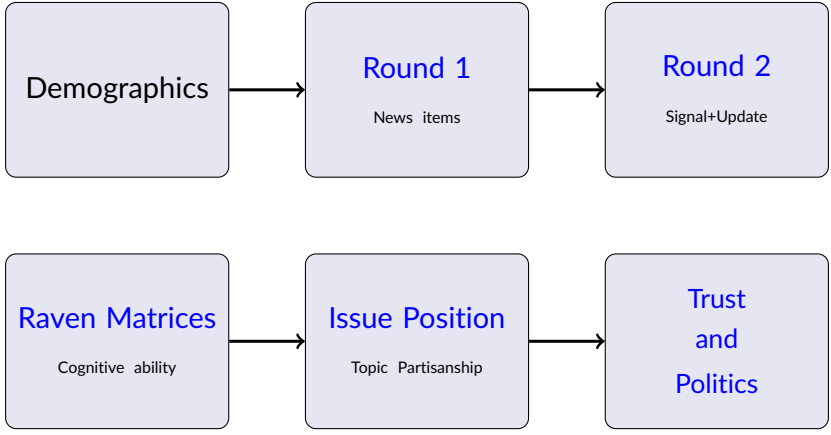
- We collected, with a survey company (Marketagent), 3,682 observations which are representative of the population in terms of age, gender and education.
- After screening we are left with 3227 observations. Time

Survey Design



Results

Hyphotesis 1

Hyphotesis 1

- **Hyphotesis 1: Cognitive ability and Quiz score**
  The news quiz performance (i.e., news quiz score) increases in cognitive ability.

Cognitive ability and Quiz score

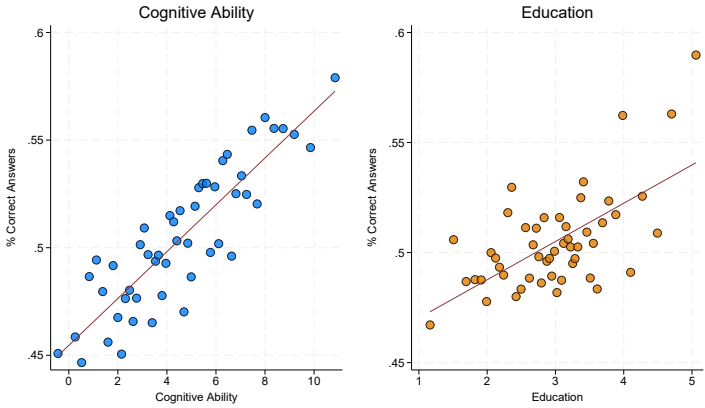


Table Robust Topic

Hyphotesis 2 & 3

Hyphotesis 2 & 3

Hyphotesis 2 & 3

- **Hyphotesis 2: Cognitive ability in the countermotivated state**
  The likelihood of giving a correct answer in the countermotivated state increases in cognitive ability.

- **Hyphotesis 3: Cognitive ability in the motivated state**
  The likelihood of giving a correct answer in the motivated state increases in cognitive ability.

Hyphotesis 2 & 3

- News items are balanced by type (pro or anti) within a topic.

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Hyphotesis 2 & 3

- We called **motivated state** the state in which the bias of the question matches the bias of the respondent (e.g. pro immigrant respondent and pro immigrant correct answer).
- We called **countermotivated state** the state in which the bias of the question is opposite to the bias of the respondent (e.g. pro immigrant respondent and anti-immigrant correct answer).
- We define as **motivated reasoning** the difference between the score in the two states.

Hyphotesis 2 & 3

- Restrict the sample to just the partisan types (pro or anti).
- Drop neutral respondents.
- We show that cognitive ability and education is still positively associated with the score in both states.

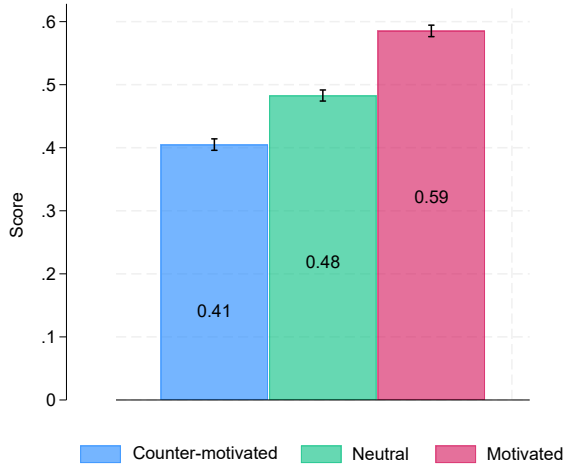

Figure 1: Motivated reasoning

Motivated Beliefs and Quiz score

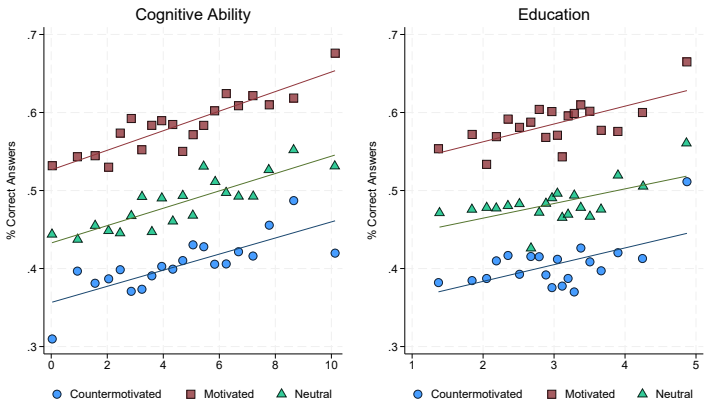

Table Topic Correlates Robust Alternative Motivated Topic Neutral Science

Updating

Updating

- Does partisanship affect updating?

Motivated Updating

Motivated Updating

- Fix the signal to be opposite to the respondent's answer in the first round.

Motivated Updating

- Fix the signal to be opposite to the respondent's answer in the first round.
- Does the probability of updating increase when the answer in round 1 was opposite to the respondent's partisanship?

$$E[\text{Update} \mid \text{signal} = 1, \text{Motivated} = 1] > E[\text{Update} \mid \text{signal} = 1, \text{Motivated} = 0]$$

- In both cases (Motivated=0/1) the signal observed is the same, that is correct with 75% probability. The difference is in the direction of the updating decision.

Partisanship and updating

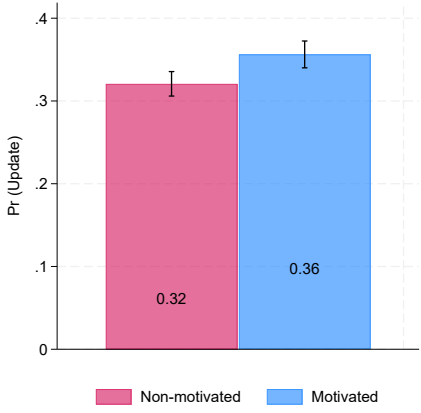

Figure 2: Topic partisanship and updating

Additional results

- Overconfidence and updating. Overconfidence
- Cross-country comparison. Cross-country

Robustness

- Double selection LASSO.
- Weight by education (Census Statistics).
- Alternative definitions of topic partisanship. Alternative
- Simulation of IQ and quiz score. Simulation
- Panel estimates of Topic partisanship and Updating. HP2 neutral HP2 Updating

Conclusion

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- Cognitive ability and education above all matter too!

Conclusion

- Motivated reasoning (and overconfidence) are important biases when it comes to the ability to sort fact from fiction and process information.
- Cognitive ability and education above all matter too!
- They help us to navigate in this complex world of (mis)information.

Thank you!

edoardo.cefala@wu.ac.at

HP1 Topic

Science

Table 1: Hypothesis 1 Topic

	Immigration	Climate	Science	Inequality	Neutral
	(1)	(2)	(3)	(4)	(5)
Cognitive Ability	0.015***	0.011***	0.006***	0.013***	0.009***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Education	0.015***	0.024***	0.008*	0.028***	0.023***
	(0.005)	(0.005)	(0.005)	(0.007)	(0.007)
Observations	3227	3227	3227	3227	3227
Controls	Y	Y	Y	Y	Y
Month FE	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y

HP1

Hyphotesis 4

Hyphotesis 4

- **Hyphotesis 4: Effect of overconfidence on updating**
  Overconfident individuals are less likely to update and change their answers after a signal that conflicts with their initial assessment.

Hyphotesis 4

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- Overconfidence is measured as the difference between the respondent's expected score and the actual score. Distribution

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- Overconfidence is measured as the difference between the respondent's expected score and the actual score. Distribution
- Update: is a dummy variable that takes the value of 1 if the respondent updates the answer after a contrasting signal and 0 otherwise.
- Contrasting signal: the signal is opposite to the respondent's answer in the first round.

Overconfidence and updating

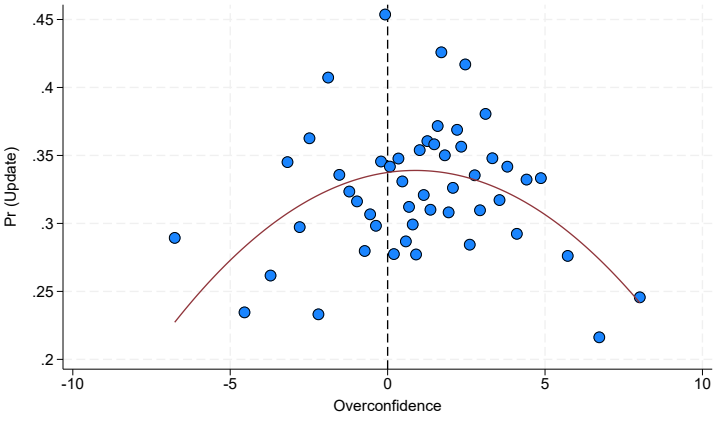


Figure 3: Overconfidence and updating

Table Robust Additional Signal Split additional

Figure 4: Left misinformation

motivation

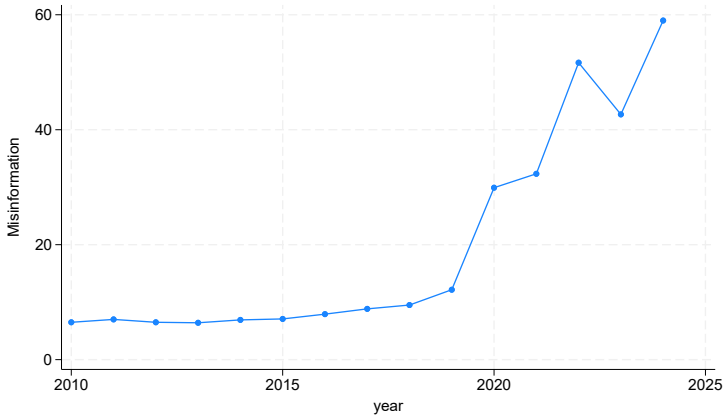
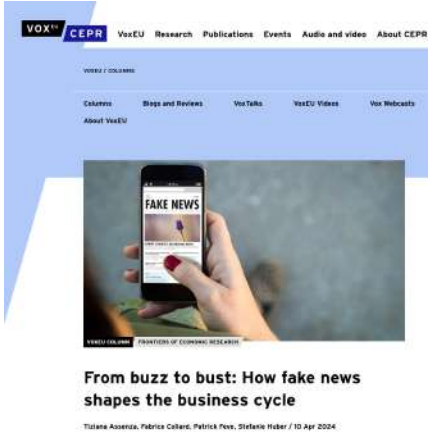


Figure 5: Misinformation trend

motivation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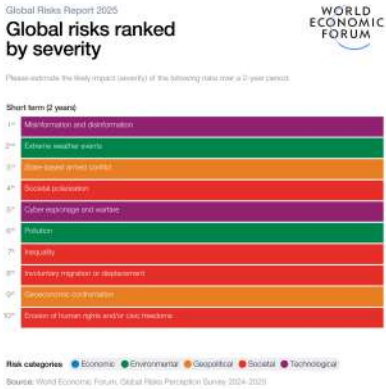
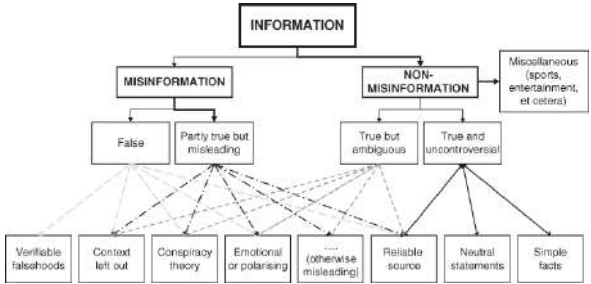
From buzz to bust: How fake news shapes the business cycle
Titiana Assenza, Fabrice Collard, Patrick Feve, Stefanie Huber / 10 Apr 2024

motivation


Global Risks Report 2025
Global risks ranked by severity
WORLD ECONOMIC FORUM
Please estimate the likely impact (severity) of the following risks over a 2-year period.
Short term (2 years)
1st Misinformation and disinformation
2nd Extreme weather events
3rd State-based armed conflict
4th Societal polarization
5th Cyber espionage and warfare
6th Pollution
7th Inequality
8th Involuntary migration or displacement
9th Geoeconomic confrontation
10th Erosion of human rights and/or civic freedoms
Risk categories Economic Environmental Geopolitical Societal Technological
Source: World Economic Forum, Global Risks Perception Survey 2024-2025

motivation

motivation



Misinformation is information that is false or misleading, irrespective of intention or source. **?**

motivation

Round 1

Round 1

- 16 news items on several politicised topics. Table Distribution
- Topics are:
  - Immigration
  - Climate change
  - Science
  - Inequality

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- 16 news items on several politicised topics. Table Distribution
- Topics are:
  - Immigration
  - Climate change
  - Science
  - Inequality
- News items are balanced by topic partisanship. Example
- Additional 2 neutral questions.

Round 2

- For each news item in Round 1, we provide a signal. Example
- The signal reports the correct answer with 75% probability. (Noisy fact-checking message)
- The signal is randomly assigned to report the correct answer to 75% of the respondents and the wrong one to 25%.
- Respondents can update their answer to each question after having observed the signal.
- Update. Table

Raven Matrices

- 12 Raven matrices questions.
- Proxy for cognitive ability. Example Distribution

Attitudinal questions

- We ask respondents' opinions on all the topics of the quiz (issue position). Example

Attitudinal questions

- We ask respondents' opinions on all the topics of the quiz (issue position). Example
- Topic Partisanship: we classify respondents as partisan using their issue position. Definition Definition Econ Formula Summary Correlates Simulation LR

Additional controls

- Educational attainment (1-5 scale). Distribution
- Controls: income (high/low), age, gender, employment status, immigration status (mother, father and respondent), vote for extremist party, average trust (media, politicians, scientists), media consumption, country and month fixed effects.

Just-follow-the-signal Benchmark

Just-follow-the-signal Benchmark

- How do respondents' performance compare to the counterfactual scenario in which they just follow the signal?
- Calculate for each respondent her expected score given the signals observed.
- Assume that, in cases in which she observes a signal that is opposite to her opinion, she updates her answer according to the received signal.
- Calculate the difference between actual and predicted score.

Just-follow-the-signal Benchmark

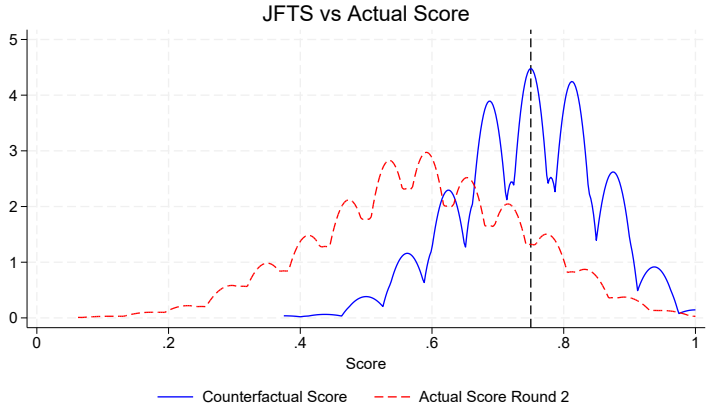


Figure 6: Just-follow-the-signal Benchmark

Table Plot Updating

Cross country comparison

- HP 1 Plot
- HP 2 & 3 Plot
- HP 4 Plot
- Motivated Updating Plot

additional

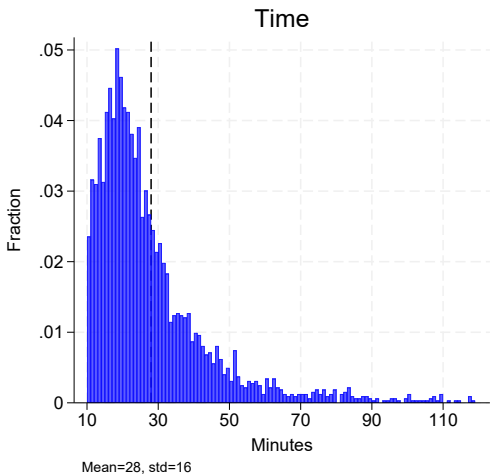
Literature

- **Motivated Beliefs:** ?; ?; ?; ?; ?; ? ;?; ?; ? ; ?.
- **Fake News & Misinformation**: ?; ?; ? ; ?; ?; ?; ?; ?.

◂ contribution

Descriptives

Data


Time
Fraction
.05
.04
.03
.02
.01
0
10
30
50
70
90
110
Minutes
Mean=28, std=16

Round 1 example

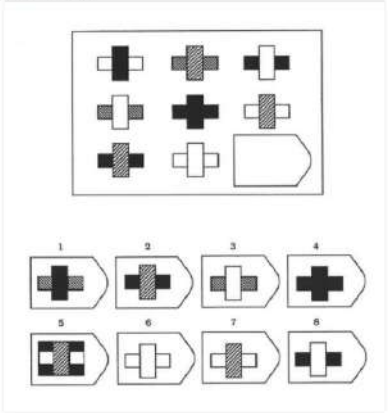
- In 2017, a prestigious demographic research organisation made a forecast on the number of children for Muslim and non-Muslim women in the EU between 2015 and 2020. According to the forecast, a typical Muslim woman in the EU has:
  a. 1 more child
  b. 3 more children
  than a non-Muslim one.

- True or false? According to official statistics, Muhammad was the most popular first name for newborn boys in several regions of England in 2020.

◂ Round 1

Raven matrices

Please select the missing **image** that **completes the pattern below.**



◉ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8

Round 2

In 2017, a prestigious demographic research organisation made a forecast on the **number of children for Muslim and non-Muslim women in the EU** between 2015 and 2020. According to the forecast, a typical Muslim woman in the EU has

- (●) 3 more children
- ( ) 1 more child

than a non-Muslim one.

You answered "3 more children"

The report says: 1 more child

Reminder: the report shows the **correct answer in 3 out of 4 cases** and the **false answer in 1 out of 4 cases.**

You may now change your answer above if you wish.

Next

Issue Position-Worldview

For each of the following **statements**, can you please indicate how strongly you **agree** or **disagree** with the statement?

	agree strongly	agree	neither agree nor disagree	disagree	disagree strongly
Many of the claims about environmental threats are exaggerated.	◉	○	○	○	○
Immigrants make crime problems in the UK worse.	◉	○	○	○	○
We can no longer trust scientists on controversial scientific and technological issues because they depend more and more on money from industry.	◉	○	○	○	○
Large differences in people's incomes are acceptable to properly reward differences in talent and effort.	◉	○	○	○	○

Issue Position correlates

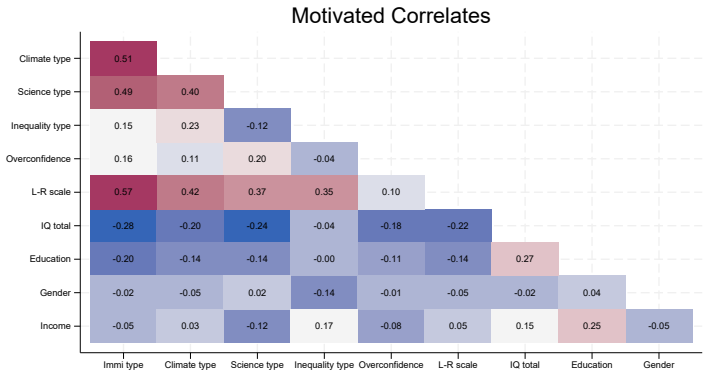


Figure 8: Correlates

◂ variables

Issue Position LR

◂ variables

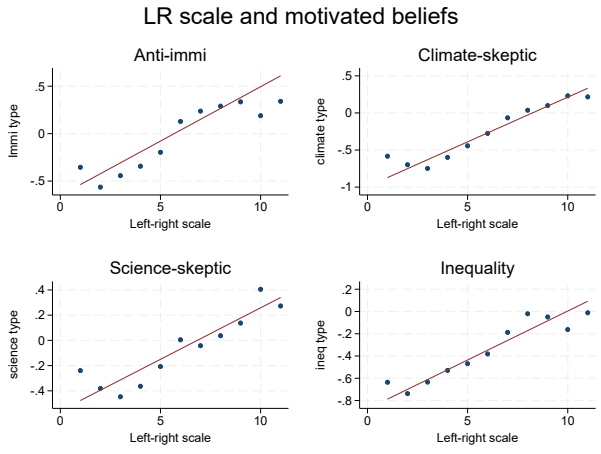


Figure 9: LR motivated beliefs

Science Motivated Beliefs

◂ Topic

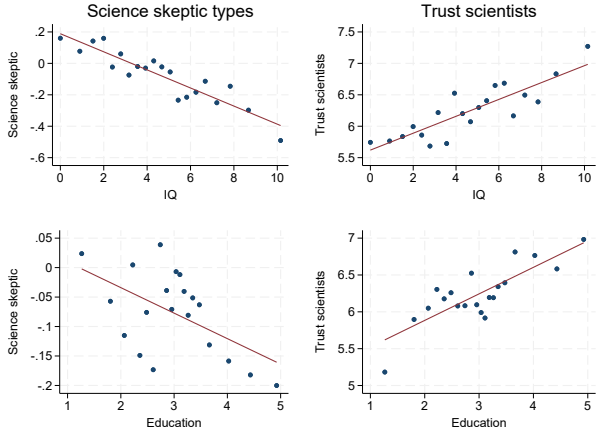


Figure 10: Science Motivated Beliefs

Science Motivated Beliefs

◂ Plot

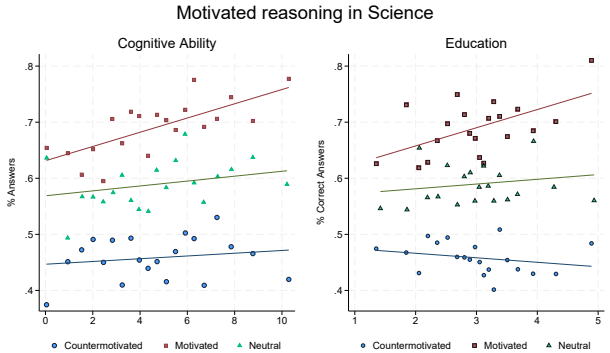


Figure 11: Science Motivated reasoning

People do not seem to be at liberty to conclude whatever they want to conclude merely because they want to. Rather, ***I propose that people motivated to arrive at a particular conclusion attempt to be rational and to construct a justification of their desired conclusion that would persuade a dispassionate observer. They draw the desired conclusion only if they can muster up the evidence necessary to support it****. In other words, they maintain an "illusion of objectivity"..... The objectivity of this justification construction process is illusory because people do not realize that the process is biased by their goals, that they are accessing only a subset of their relevant knowledge, that they would probably access different beliefs and rules in the presence of directional goals, and that they might even be capable of justifying opposite conclusions on different occasions. (Kunda 1990)*

◂ variables

This idea is captured in the common saying, "People believe what they want to believe." But people don't simply believe what they want to believe. The psychological mechanisms that produce motivated beliefs are much more complicated than that. ***People generally reason their way to conclusions they favor, with their preferences influencing the way evidence is gathered, arguments are processed, and memories of past experience are recalled. Each of these processes can be affected in subtle ways by people's motivations, leading to biased beliefs that feel objective.***

?

◂ variables

Data observations

	Austria	Germany	UK	Total
June	179	178	153	510
September	839	603	126	1,568
October	216	487	891	1,594
November	0	0	10	10
Total	1,234	1,268	1,180	3,682

Table 2: Observations by country and month

◂ Data

	Overall Mean	AT Mean	DE Mean	UK Mean
Q15	0.18	0.17	0.16	0.21
Q16	0.16	0.15	0.16	0.17
Q17	0.18	0.16	0.16	0.23
Q18	0.16	0.13	0.15	0.21
Q19	0.14	0.11	0.12	0.19
Q20	0.14	0.12	0.13	0.18
Q21	0.21	0.20	0.20	0.23
Q22	0.19	0.17	0.15	0.25
Q23	0.15	0.13	0.15	0.18
Q24	0.15	0.14	0.15	0.16
Q25	0.15	0.14	0.13	0.19
Q26	0.13	0.11	0.10	0.18
Q27	0.16	0.13	0.12	0.25
Q28	0.17	0.15	0.14	0.22
Q29	0.15	0.12	0.12	0.20
Q30	0.17	0.15	0.13	0.23
Total	0.16	0.14	0.14	0.21
Observations	3227	1098	1113	1016

◂ variables

No.	Statement	Scale
Q66A1	Protecting the environment should be given priority, even if it causes slower economic growth and some loss of jobs. vs Economic growth and creating jobs should be the top priority, even if the environment suffers to some extent.	1-7
Q66A2	Immigrants take jobs away from the British. vs Immigrants do not take jobs away from the British.	1-7
Q66A3	I am very worried about climate change. vs I am not at all worried about climate change.	1-7
Q66A4	UK's cultural life is enriched by migrants coming to live here from other countries. vs UK's cultural life is undermined by migrants coming to live here from other countries.	1-7
Q67A1	The government should take measures to reduce differences in income levels.	1-5 (agree strongly-disagree strongly)
Q67A2	Many of the claims about environmental threats are exaggerated.	1-5 (agree strongly-disagree strongly)
Q67A3	Large differences in people's incomes are acceptable to properly reward differences in talent and effort.	1-5 (agree strongly-disagree strongly)
Q67A4	Immigrants make crime problems in the UK worse.	1-5 (agree strongly-disagree strongly)
Q67A5	A small secret group of people is responsible for making all major decisions in world politics.	1-5 (agree strongly-disagree strongly)
Q67A6	Immigrants are generally good for the UK's economy.	1-5 (agree strongly-disagree strongly)
Q67A7	The money and wealth in the UK should be more evenly distributed among people.	1-5 (agree strongly-disagree strongly)
Q67A8	When jobs are scarce, employers should give priority to British people over immigrants.	1-5 (agree strongly-disagree strongly)
Q67A9	We can no longer trust scientists on controversial scientific and technological issues because they depend more and more on money from industry.	1-5 (agree strongly-disagree strongly)
Q68A1	Viruses have been produced in government laboratories to control our freedom.	1-6 (very unlikely-very likely)
Q68A2	Climate change is for the most part caused by natural cycles rather than human activities.	1-6 (very unlikely-very likely)

Table 3: Your caption

◂ variables

We simulate 1000 times two scenarios:

- 1. A scenario in which the allocation of types (-1,0,1) is random
- 2. A scenario in which the answers to opinion questions are random and then coded into types.
- We then compute the number of cases in which we detect a positive and significant association between types and left to right scale.
- We find this association in just 2% of the cases when the respondents behave randomly.
- It is thus highly unlikely that we find this association by chance.

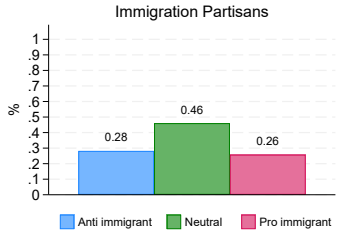
Table 4: Simulation, random types

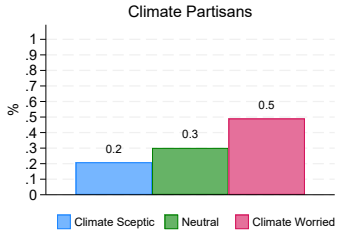
	immigration	climate	science	inequality
	%	%	%	%
significant	0.02	0.02	0.02	0.02
Observations	1000	1000	1000	1000

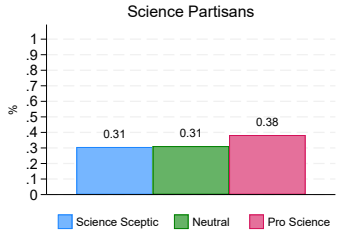
◂ variables

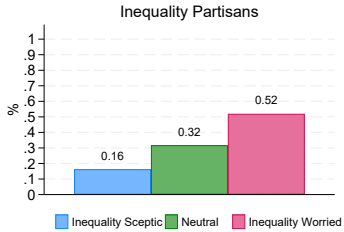
Table 5: Simulation, random answer to opinion questions

	immigration	climate	science	inequality
	%	%	%	%
significant	0.02	0.02	0.02	0.02
Observations	1000	1000	1000	1000


Immigration Partisans
%
0
.1
.2
.3
.4
.5
.6
.7
.8
.9
1
0.28
0.46
0.26
Anti immigrant
Neutral
Pro immigrant


Climate Partisans
%
0
.1
.2
.3
.4
.5
.6
.7
.8
.9
1
0.2
0.3
0.5
Climate Sceptic
Neutral
Climate Worried


Science Partisans
%
0
.1
.2
.3
.4
.5
.6
.7
.8
.9
1
0.31
0.31
0.38
Science Sceptic
Neutral
Pro Science


Inequality Partisans
%
0
.1
.2
.3
.4
.5
.6
.7
.8
.9
1
0.16
0.32
0.52
Inequality Sceptic
Neutral
Inequality Worried

◂ variables

	Round 1				Round 2			
	Overall Mean	AT Mean	DE Mean	UK Mean	Overall Mean	AT Mean	DE Mean	UK Mean
Q15	0.35	0.29	0.35	0.40	0.46	0.41	0.46	0.53
Q16	0.44	0.39	0.31	0.63	0.53	0.49	0.43	0.68
Q17	0.35	0.30	0.37	0.37	0.48	0.43	0.47	0.53
Q18	0.67	0.72	0.70	0.58	0.71	0.74	0.74	0.64
Q19	0.73	0.77	0.76	0.67	0.74	0.78	0.76	0.69
Q20	0.63	0.62	0.67	0.58	0.69	0.68	0.71	0.66
Q21	0.39	0.37	0.36	0.44	0.50	0.46	0.48	0.57
Q22	0.31	0.29	0.33	0.32	0.45	0.42	0.44	0.50
Q23	0.54	0.52	0.55	0.54	0.59	0.56	0.61	0.61
Q24	0.61	0.62	0.56	0.65	0.66	0.66	0.62	0.70
Q25	0.49	0.46	0.53	0.48	0.57	0.55	0.57	0.59
Q26	0.68	0.73	0.73	0.56	0.71	0.75	0.74	0.63
Q27	0.16	0.14	0.15	0.19	0.30	0.25	0.24	0.41
Q28	0.60	0.64	0.62	0.55	0.67	0.69	0.67	0.65
Q29	0.60	0.62	0.63	0.53	0.63	0.65	0.69	0.55
Q30	0.55	0.59	0.64	0.40	0.63	0.65	0.69	0.55
Total	0.50	0.50	0.52	0.49	0.58	0.57	0.58	0.59
Observations	3227	1098	1113	1016	3227	1098	1113	1016

◂ variables

- We set as neutral the middle values of opinion questions (E.g. 3 and 4 for a 1-6 scale). Hence, Opinion (Q_{ij}) is rescaled to -1, 0, 1.

- We calculate the average value by topic:

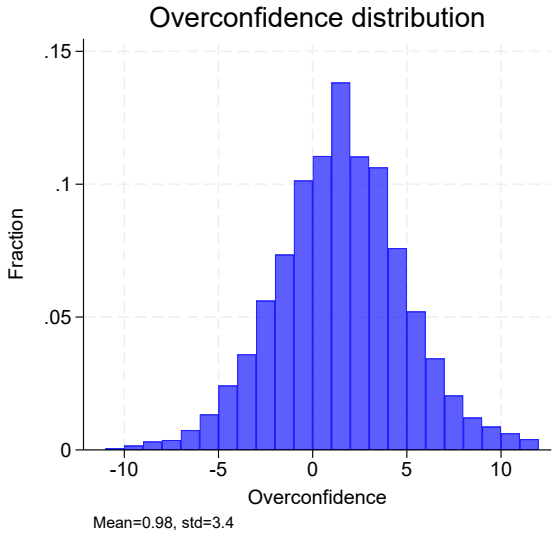
$$\bar{Q}_j = \frac{1}{N}\sum_{i=1}^{N} Q_{ij}$$

◂ variables

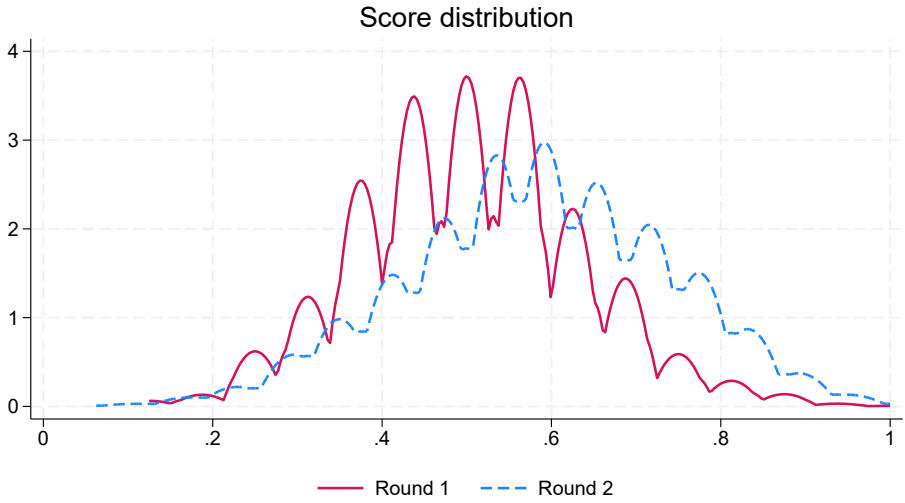
- Then we assign individuals to types based on the average score and sub-questions:

$$\text{Type} = \begin{cases} \text{Anti} = 1 & \text{if } \bar{Q}_j > 0 \text{ and } \nexists Q_{ij} < 0 \\ \text{Neutral} = 0 & \text{Otherwise} \\ \text{Pro} = -1 & \text{if } \bar{Q}_j < 0 \text{ and } \nexists Q_{ij} > 0 \end{cases}$$

◂ overconfidence

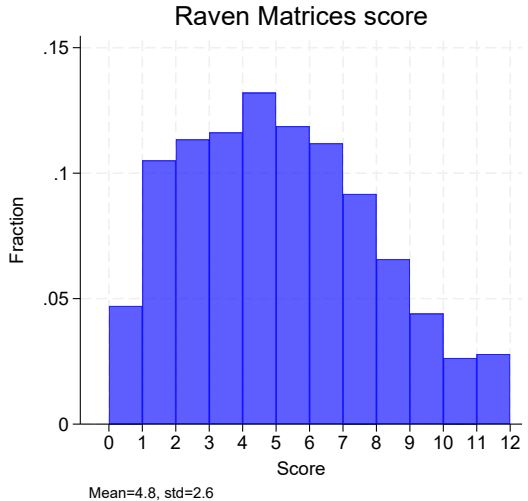


◂ variables

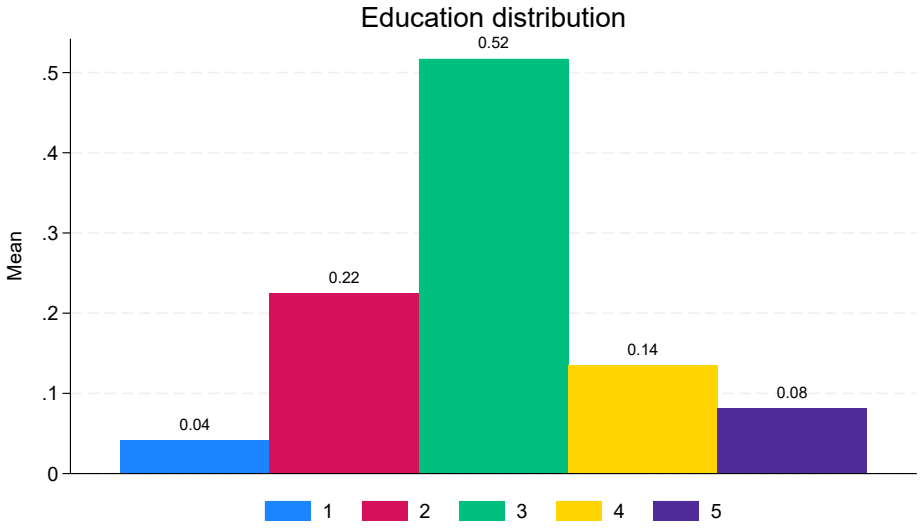


Mean Round 1=0.5, Mean Round 2=0.58

◂ Variables


Raven Matrices score
.15
.1
.05
0
Fraction
0 1 2 3 4 5 6 7 8 9 10 11 12
Score
Mean=4.8, std=2.6

Variables


Education distribution
Mean
0
.1
.2
.3
.4
.5
0.04
0.22
0.52
0.14
0.08
1
2
3
4
5

Results

Table 6: Cognitive ability and Quiz score

	IQ			Education			IQ & Education
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Cognitive Ability	0.012***	0.012***	0.012***				0.011***
	(0.001)	(0.001)	(0.001)				(0.001)
Education				0.023***	0.026***	0.024***	0.018***
				(0.003)	(0.003)	(0.003)	(0.003)
Observations	3227	3227	3227	3227	3227	3227	3227
Controls	N	N	Y	N	N	Y	Y
Month FE	N	Y	Y	N	Y	Y	Y
Country FE	N	Y	Y	N	Y	Y	Y

◂ Plot

Table 7: Motivated beliefs and quiz score

	Countermotivated			Motivated		
	(1)	(2)	(3)	(4)	(5)	(6)
Cognitive Ability	0.011***	0.011***	0.011***	0.012***	0.012***	0.012***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Education	0.023***	0.023***	0.016***	0.010**	0.012**	0.017***
	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)
Observations	3112	3112	3112	3112	3112	3112
Controls	N	N	Y	N	N	Y
Month FE	N	Y	Y	N	Y	Y
Country FE	N	Y	Y	N	Y	Y

◂ Plot

◂ Plot

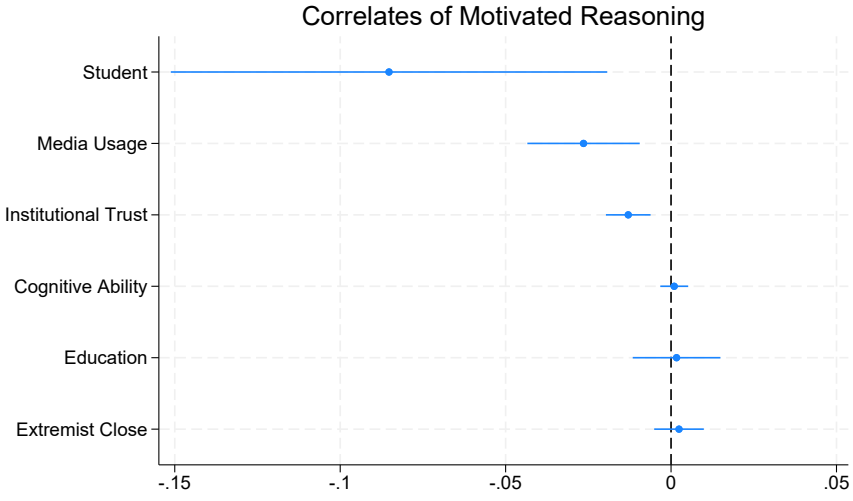


Figure 12

Table 8: Overconfidence

	All				Overconfident/ well-calibrated				Underconfident			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Overconfidence	0.002	0.001	−0.000	−0.000	−0.005*	−0.008***	−0.010***	−0.010***	0.008	0.009*	0.010*	0.010*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)	(0.005)
Consistent				−0.003				0.002				−0.013**
				(0.003)				(0.004)				(0.006)
Cognitive Ability			0.011***	0.011***			0.012***	0.012***			0.006	0.005
			(0.002)	(0.002)			(0.003)	(0.003)			(0.004)	(0.004)
Education			−0.002	−0.002			0.003	0.003			−0.014	−0.013
			(0.007)	(0.007)			(0.009)	(0.009)			(0.011)	(0.012)
Observations	3227	3227	3227	3227	2192	2192	2192	2192	1035	1035	1035	1035
Controls	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y
Month FE	N	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y
Country FE	N	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y

◂ Plot

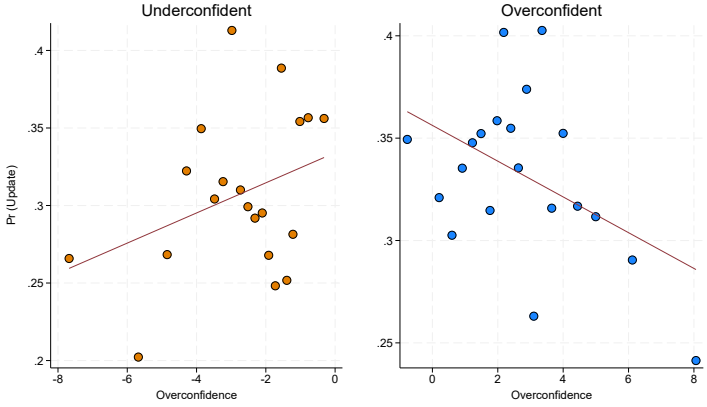
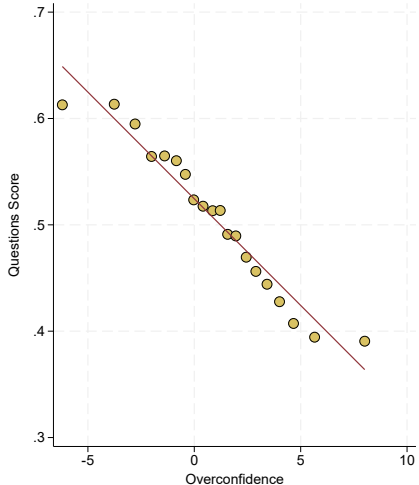
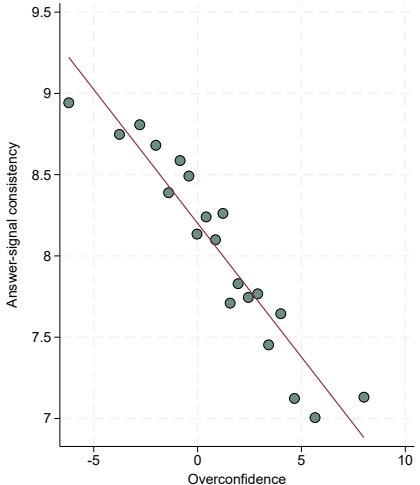


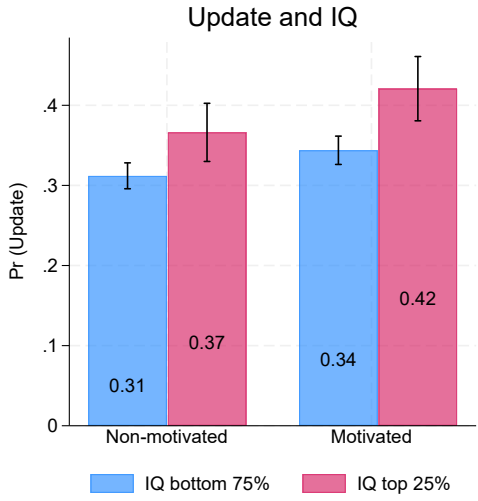
Figure 13: Overconfidence and updating

Plot

◂ Plot


.7
.6
.5
.4
.3
Questions Score
-5
0
5
10
Overconfidence


9.5
9
8.5
8
7.5
7
Answer-signal consistency
-5
0
5
10
Overconfidence


Update and IQ
Pr (Update)
0
.1
.2
.3
.4
0.31
0.37
0.34
0.42
Non-motivated
Motivated
IQ bottom 75%
IQ top 25%

Plot

Table 9: Motivated beliefs and quiz score

	Baseline	FE	Full
	(1)	(2)	(3)
Motivated	0.036***	0.036***	0.036***
	(0.011)	(0.011)	(0.011)
Cognitive Ability	0.008***	0.012***	0.012***
	(0.002)	(0.002)	(0.002)
Education	0.007	−0.004	−0.007
	(0.006)	(0.006)	(0.007)
Observations	4980	4980	4980
Controls	N	Y	Y
Month FE	N	Y	Y
Country FE	N	Y	Y

◂ Plot

Robustness

Table 10: Hypothesis 1

	LASSO	Weighted
	(1)	(2)
Cognitive Ability	0.009***	0.011***
	(0.001)	(0.001)
Education	0.015***	0.018***
	(0.003)	(0.003)
Observations	2678	3227
Controls	Y	Y
Month FE	Y	Y
Country FE	Y	Y

◂ HP1

Table 11: Hypothesis 2

	LASSO		Weighted	
	(1)	(2)	(3)	(4)
Cognitive Ability	0.010***	0.008***	0.011***	0.011***
	(0.002)	(0.002)	(0.002)	(0.002)
Education	0.015**	0.018***	0.013*	0.019***
	(0.006)	(0.006)	(0.007)	(0.007)
Observations	2592	2592	3112	3112
Controls	Y	Y	Y	Y
Month FE	Y	Y	Y	Y
Country FE	Y	Y	Y	Y

◂ HP2

Table 12: Hypothesis 2 Topic

	Immigration	Climate	Science	Inequality	All
	(1)	(2)	(3)	(4)	(5)
Motivated	0.108***	0.045***	0.116***	0.289***	0.180***
	(0.006)	(0.005)	(0.005)	(0.014)	(0.006)
Cognitive Ability	0.009***	0.006***	0.003***	0.013***	0.011***
	(0.001)	(0.001)	(0.001)	(0.003)	(0.001)
Education	0.010***	0.012***	0.004	0.029***	0.017***
	(0.004)	(0.003)	(0.003)	(0.009)	(0.004)
Observations	3482	4510	4444	4406	6224
Controls	Y	Y	Y	Y	Y
Month FE	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y

◂ HP2

Table 13: Hypothesis 2 Topic

	Immigration	Climate Change	Science	Inequality
	(1)	(2)	(3)	(4)
Cognitive Ability	0.004	0.007*	0.007	−0.014**
	(0.005)	(0.004)	(0.004)	(0.006)
Education	−0.044***	−0.008	0.041***	−0.002
	(0.015)	(0.012)	(0.013)	(0.019)
Observations	1741	2255	2222	2203
Controls	Y	Y	Y	Y
Month FE	Y	Y	Y	Y
Country FE	Y	Y	Y	Y

◂ HP2

Table 14: Hypothesis 2 Topic

	Countermotivated			Motivated			Neutral		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Cognitive Ability	0.011***	0.011***	0.011***	0.012***	0.012***	0.012***	0.011***	0.011***	0.011***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Education	0.023***	0.023***	0.016***	0.010**	0.012**	0.017***	0.016***	0.018***	0.015***
	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Observations	3112	3112	3112	3112	3112	3112	2379	2379	2379
Controls	N	N	Y	N	N	Y	N	N	Y
Month FE	N	Y	Y	N	Y	Y	N	Y	Y
Country FE	N	Y	Y	N	Y	Y	N	Y	Y

◂ HP2

Table 15: Hypothesis 4

	Overconfident		Underconfident	
	(1) LASSO	(2) Weighted	(3) LASSO	(4) Weighted
Overconfidence	−0.012***	−0.011***	0.008	0.008
	(0.004)	(0.004)	(0.006)	(0.006)
consistent	0.002	−0.000	−0.012**	−0.015**
	(0.004)	(0.005)	(0.006)	(0.007)
Observations	1819	2192	859	1035
Controls	Y	Y	Y	Y
Month FE	Y	Y	Y	Y
Country FE	Y	Y	Y	Y

◂ HP4

Table 16: Motivated updating

	LASSO	Weighted
	(1)	(2)
Motivated	0.038***	0.034***
	(0.012)	(0.013)
Cognitive Ability	0.008***	0.009***
	(0.003)	(0.003)
Education	−0.001	0.001
	(0.008)	(0.009)
Observations	4156	4980
Controls	Y	Y
Month FE	Y	Y
Country FE	Y	Y

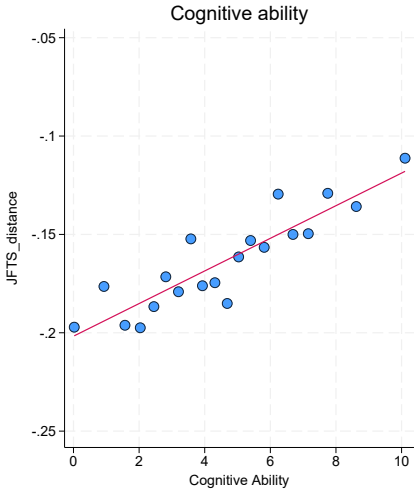
Back

Table 17: Motivated updating simulation,share of observed cases

	Motivated Updating
	%
significant	0.00
Observations	1000

Back

JFTS


Cognitive ability
JFTS_distance
-.05
-.1
-.15
-.2
-.25
0
2
4
6
8
10
Cognitive Ability

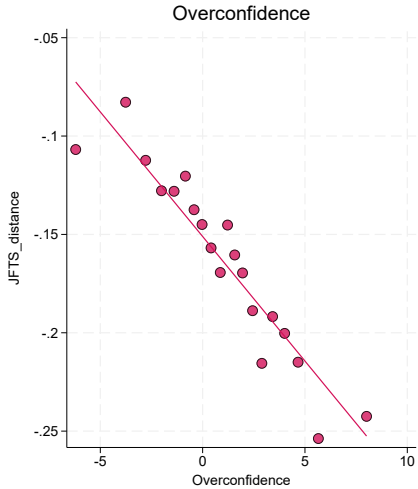

Overconfidence
JFTS_distance
-.05
-.1
-.15
-.2
-.25
-5
0
5
10
Overconfidence

Table 18: JFTS distance

	(1)	(2)	(3)
IQ Score	0.008***	0.009***	0.003***
	(0.001)	(0.001)	(0.001)
Education	0.015***	0.013***	−0.002
	(0.003)	(0.003)	(0.003)
Overconfidence	−0.012***	−0.012***	0.000
	(0.001)	(0.001)	(0.001)
Observations	3227	3227	3227
Controls	no	no	yes
Month FE	no	yes	yes
Country FE	no	yes	yes

◂ JFTS

Alternative coding of motivated beliefs

- There are three different possible scales in opinion questions: 1-6, 1-5, 1-7. In the main analysis, we rescaled as neutral values {(3,4);(3);(4)}.
- Results are robust to changing the scale. In one alternative definition, we set neutral values {(3,4);(2,3,4);(3,4,5)}. Or alternatively, we set neutral values {(2,3,4,5);(2,3,4);(2,3,4,5,6)}.
- Additionally, we set as neutral for each opinion question values within mean$\pm\sigma$

Table 19

	Countermotivated			Motivated		
	(1)	(2)	(3)	(4)	(5)	(6)
IQ	0.008***	0.008***	0.010***	0.015***	0.014***	0.012***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Education	0.018***	0.018***	0.019***	0.017***	0.023***	0.017***
	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)
Observations	3059	2689	3033	3059	2689	3033
Controls	yes	yes	yes	yes	yes	yes
Month FE	yes	yes	yes	yes	yes	yes
Country FE	yes	yes	yes	yes	yes	yes

◂ HP2

Table 20

	Motivated		
	(1)	(2)	(3)
Motivated	0.027**	0.035***	0.028**
	(0.011)	(0.013)	(0.011)
IQ_total	0.009***	0.012***	0.009***

Table 21

	Base	Individual FE	Question FE
	(1)	(2)	(3)
Motivated	0.193***	0.193***	0.170***
	(0.006)	(0.006)	(0.006)
Observations	29278	29278	29278
Individual FE	N	Y	Y
Question FE	N	N	Y

◂ Robustness

Table 22

	Base	Individual FE	Question FE
	(1)	(2)	(3)
Countermotivated	−0.085***	−0.092***	−0.093***
	(0.006)	(0.006)	(0.006)
Motivated	0.108***	0.101***	0.075***
	(0.006)	(0.006)	(0.006)
Observations	43568	43568	43568
Individual FE	N	Y	Y
Question FE	N	N	Y

◂ Robustness

Table 23

	Baseline	Individual FE	Question FE
	(1)	(2)	(3)
Motivated	0.048***	0.039***	0.026***
	(0.008)	(0.007)	(0.007)
Observations	13293	13293	13293
Individual FE	N	Y	Y
Question FE	N	N	Y

◂ Robustness

We simulate 1000 times three different scenarios:

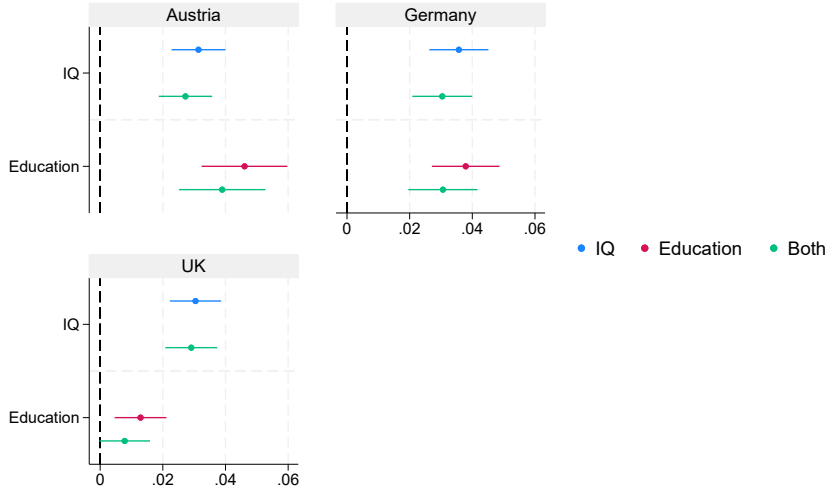
- 1. A scenario in which the quiz score and IQ are 100% random
- 2. A scenario in which only below-median IQ respondents answer randomly to news items
- 3. A scenario in which low-educated individuals answer randomly to IQ questions and news items
- We then compute the number of cases in which we detect a positive and significant association between IQ and quiz score.

Table 24: Simulation

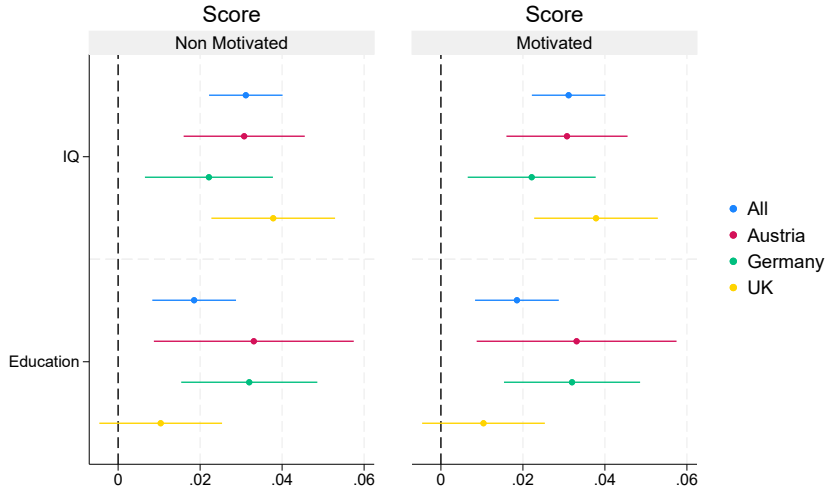
	100% random %	low IQ random %	Low education-IQ random %
significant	0.03	0.03	0.00
Observations	1000	1000	1000

Share of cases in which cognitive ability is significantly associated with quiz score.

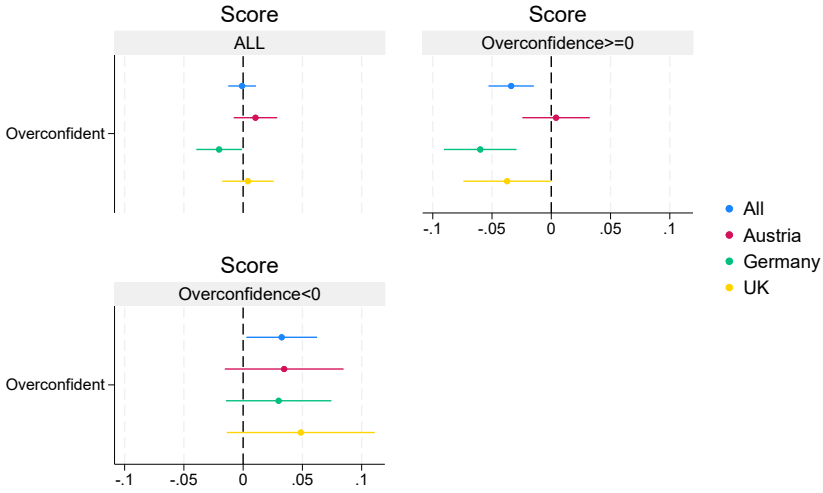
◂ Robustness



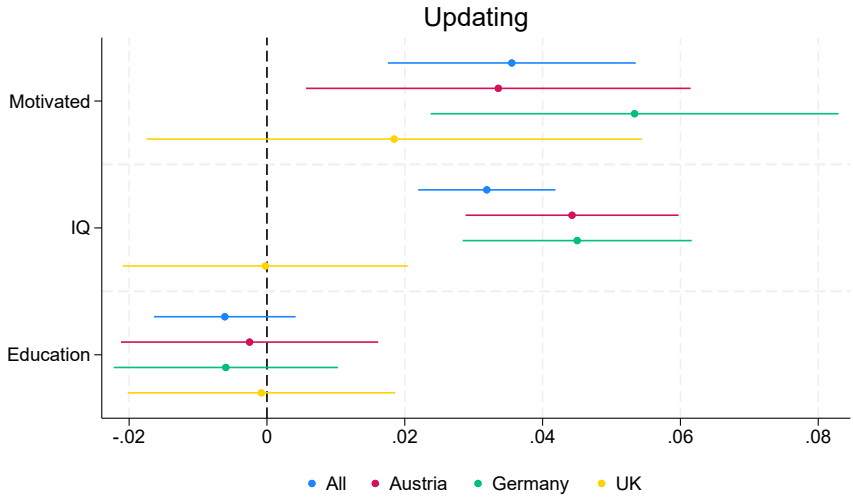
country


Score
Non Motivated
Score
Motivated
IQ
Education
0
.02
.04
.06
All
Austria
Germany
UK

country


Score
ALL
Overconfident
Score
Overconfidence>=0
-.1
-.05
0
.05
.1
Score
Overconfidence<0
Overconfident
-.1
-.05
0
.05
.1
All
Austria
Germany
UK

country


Updating
Motivated
IQ
Education
-.02
0
.02
.04
.06
.08
All
Austria
Germany
UK

country

Allcott, H. and M. Gentzkow (2017, May). Social Media and Fake News in the 2016 Election. *Journal of Economic Perspectives 31*(2), 211–236.

Angelucci, C. and A. Prat (2024, April). Is Journalistic Truth Dead? Measuring How Informed Voters Are about Political News. *American Economic Review 114*(4), 887–925.

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