Expert Disagreement: From Individual Judgment to Collective Decision-Making

Dunja Šešelja[1] and Christian Straßer[1] (first part – based on Dunja's joint work with Will Fleisher[2] and Daniel Cserhalmi Friedman[3]; second part – based on Christian and Dunja's joint work with Leah henderson[4])

October 29, 2026

1. Ruhr University Bochum, 2. Georgetown University, 3. Purdue University, 4. University of Groningen

Introduction

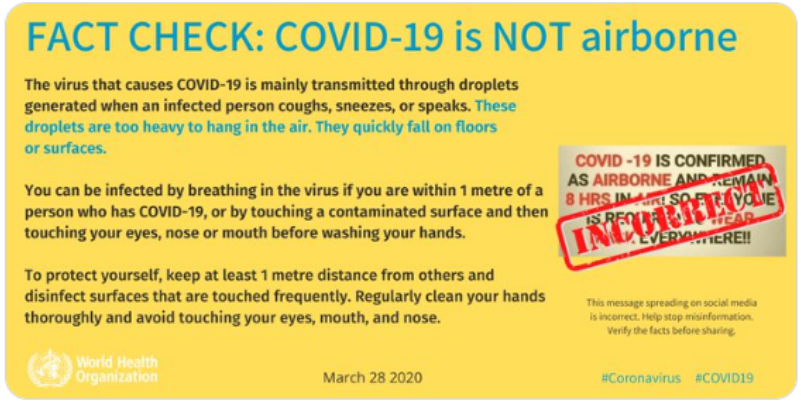
March 28, 2020

World Health Organization (WHO) @WHO

FACT: #COVID19 is NOT airborne.

The #coronavirus is mainly transmitted through droplets generated when an infected person coughs, sneezes or speaks.

To protect yourself:
-keep 1m distance from others
-disinfect surfaces frequently
-wash/rub your 👐
-avoid touching your 👀👃👄



PAHO/WHO and 6 others

7:44 PM · Mar 28, 2020 · Twitter Web App

39.4K Retweets **4,334** Quote Tweets **44.1K** Likes Tip

NEWS FEATURE | 06 April 2022

Why the WHO took two years to say COVID is airborne

Early in the pandemic, the World Health Organization stated that SARS-CoV-2 was not transmitted through the air. That mistake and the prolonged process of correcting it sowed confusion and raises questions about what will happen in the next pandemic.

Dyani Lewis

Something went wrong with the expert judgment...

What kinds of reasons should undergird expert judgment?

Expertise

Expertise

– involves possession of relevant knowledge/evidence and sufficient competence at evaluating relevant evidence/deploying relevant knowledge.

(For a detailed discussion, see Grundmann, forthcoming)

Expert judgment

Main focus in philosophical discussions

The role of non-epistemic values

Douglas, 2008

- Epistemic support (warrant) for a claim should be based on evidence.
- Values play an indirect role: they help to weigh how strong the evidence is (for the acceptance/rejection of the policy-relevant claim).

Expert judgment

Main focus in philosophical discussions

The role of non-epistemic values

Douglas, 2008

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Epistemic reasons: reduced to evidence

In the first part of this talk

- We will argue that such a simplified evidentialist view of the relevant epistemic reasons for expert judgment can be misleading
- Two other kinds of epistemic reasons, so far overlooked in the literature on expertise:
  - Higher-order evidence
  - Inquisitive reasons

A challenge for collective decision-making?

How should advisory boards aggregate those divided opinions into a policy recommendation?

In the second part of the talk

- We will present a computer simulation (an agent-based model)
- The model simulates different decision-making strategies in the context of expert disagreement, and their impact on successful policy-making and on public trust in science.

Introduction

The Aerosol COVID-19 Controversy

Overlooked Epistemic Reasons

- Higher-Order Evidence
- Inquisitive Reasons

Modeling Collective Decision-Making

Conclusion

The Aerosol COVID-19 Controversy

Three methods of COVID-19 transmission

Early discussions in the pandemic: three methods of transmission:

1. Droplet: droplets are expelled from infected individuals and enter the systems of others
    - masks and social distancing
2. Fomite: non-infected persons come into direct contact with contaminated surfaces
    - wiping down potentially contaminated surfaces and avoiding close contact
3. Aerosol: infectious particles linger in the air and enter systems of others.
    - different kinds of masking, ensuring sufficient ventilation, etc.

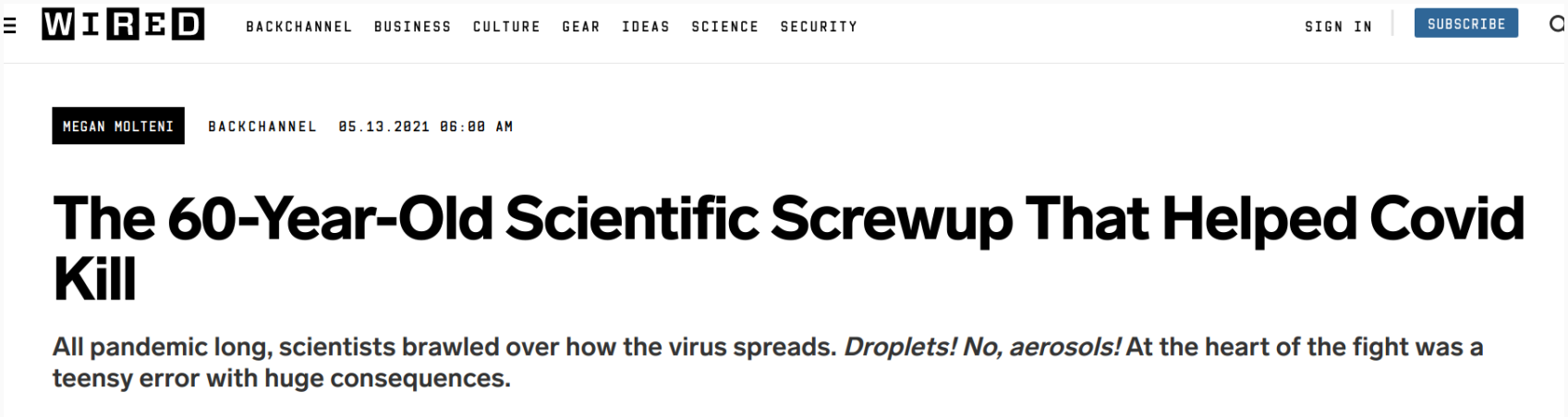
WHO stance

Aerosol transmission:

- A less significant focus of concern
- Because of difficulties with obtaining direct evidence by culturing the virus from (possibly contaminated) air particles.

More general background:

A decades long mistaken view on aerosols as necessarily smaller than five microns.



https://www.wired.com/story/the-teeny-tiny-scientific-screwup-that-helped-covid-kill/

The impact

Los Angeles Times

Latest: COVID-19 | Virus tracker | Hospitalizations | Vaccines | Newsletter

WORLD & NATION

A choir decided to go ahead with rehearsal. Now dozens of members have COVID-19 and two are dead



Skagit Valley Chorale members Mark Backlund and his wife, Ruth Backlund, sing choir music Friday at their home in Anacortes, Wash., while convalescing from COVID-19. (Karen Ducey / For The Times)

BY RICHARD READ

MARCH 29, 2020 7:34 PM PT

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CALIFORNIA
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The reality of legal weed in California: Huge illegal grows, violence, worker exploitation and deaths

CALIFORNIA
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Nobody knows how widespread illegal cannabis grows are in California. So we mapped them

BUSINESS
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L.A.'s rich are rushing to join a new class of members-only clubs — if they can get in

ENTERTAINMENT & ARTS
Meghan and Harry go simple and subtle in their 'loving' tribute to Queen Elizabeth II

https://www.latimes.com/world-nation/story/2020-03-29/coronavirus-choir-outbreak

Problem:

The assessment made by the WHO:

- Primarily based on 'evidential reasons': reasons grounded in scientifically obtained evidence that supports or undermines a certain hypothesis.
  - Specifically: the focus is on first-order evidence.
- E is evidence for H iff the truth of E raises the probability of the truth of H.
- Problem: there are relevant reasons other than (first-order) evidence.

Overlooked Epistemic Reasons

Overlooked Epistemic Reasons

Higher-Order Evidence

Higher-order evidence

- Higher-order Evidence (HOE): "evidence which bears on a believer's rational capacities, epistemic performance, or evidential situation." (Horowitz, 2022)

Debated in the epistemology of peer disagreement

Feldman, 2005, Kelly, 2010, Christensen, 2010, LasonenAarnio, 2014, Skipper and Steglich-Petersen, 2019, Whiting, 2020, Dorst, 2020, etc.

- HOE $\Longrightarrow$ (FOE $\Longrightarrow$ A) (higher-order support)
- HOE $\Longrightarrow$ (FOE $\not\Longrightarrow$ A) (higher-order defeat)

Higher-order evidence

For example: peer disagreement

- I have good reasons to consider theory T the best account of a given domain of phenomena.
- A peer disagrees: we've exchanged our reasons and I still believe I am right and you are wrong.
- The fact that my peer disagrees indicates that I might be wrong after all

- FOE: evidence for T as the best theory in the given domain.
- HOE: not everyone agrees, hence I might be wrong. (Hence: I should lower my confidence in my view on T)

April 2020

Fact check: COVID-19 is not airborne

COVID-19 02 April 2020



The World Health Organization has moved to dispel the myth that COVID-19 is an airborne virus. This and many more myths about COVID-19 virus are spreading in South Africa and globally.

https://www.discovery.co.za/corporate/covid19-fact-check-covid-19-is-not-airborne

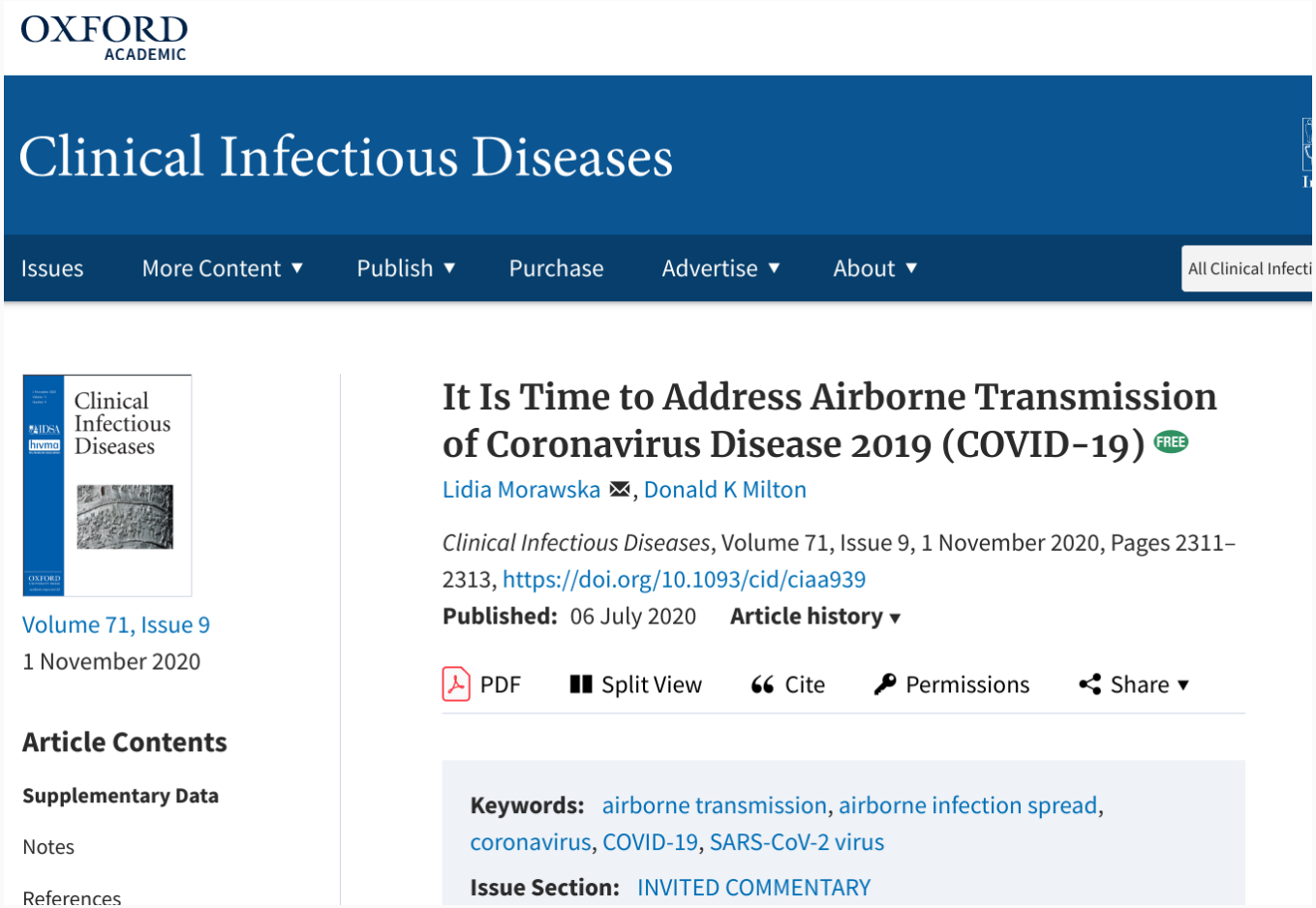
NEWS FEATURE · 08 JULY 2020 · UPDATE 23 JULY 2020

Mounting evidence suggests coronavirus is airborne — but health advice has not caught up

Governments are starting to change policies amid concerns that tiny droplets can carry SARS-CoV-2. And after months of denying the importance of this, the World Health Organization is reconsidering its stance.

July 2020, Morawska and Milton, 2020

239 “infectious-disease physicians, epidemiologists, engineers and aerosol scientists” published commentary indicating their conviction that aerosol transmission was a real threat and urging the WHO to explore it further.



OXFORD ACADEMIC

Clinical Infectious Diseases

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Volume 71, Issue 9
1 November 2020

Article Contents

Supplementary Data

Notes

References

It Is Time to Address Airborne Transmission of Coronavirus Disease 2019 (COVID-19) FREE

Lidia Morawska ✉, Donald K Milton

Clinical Infectious Diseases, Volume 71, Issue 9, 1 November 2020, Pages 2311–2313, https://doi.org/10.1093/cid/ciaa939

Published: 06 July 2020 **Article history** ▾

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Keywords: airborne transmission, airborne infection spread, coronavirus, COVID-19, SARS-CoV-2 virus

Issue Section: INVITED COMMENTARY

WHO response

- These experts disagreed with the WHO
- WHO responded by acknowledging that aerosols couldn't be ruled out, especially in poorly ventilated places
- But it stuck to the up-to-6-feet (1.5 m) rule, advising people to wear masks indoors only if they couldn't keep that distance.

WHO response

- These experts disagreed with the WHO
- WHO responded by acknowledging that aerosols couldn't be ruled out, especially in poorly ventilated places
- But it stuck to the up-to-6-feet (1.5 m) rule, advising people to wear masks indoors only if they couldn't keep that distance.

The published commentary, signed by scientists

- not itself direct evidence for aerosol transmission
- however: it is evidence pertaining to the epistemic status of all the hypothesis of COVID-19 transmission, indicating that WHO could be wrong after all.

WHO stance

- It took until 20 October 2020 for the WHO to acknowledge that aerosols transmit the virus
- Only in December 2021 the WHO used the term ‘airborne’ in its reports (Lewis, 2022)

The commentary on aerosol transmission

Friedman and Šešelja, 2023

Desiderata for scientifically relevant HOE

- Relevant expertise
- Good acquisition
- Diversity
- Scope

- HOE based on on expert disagreement, which was scientifically relevant
- Failed to be taken into account by the WHO

Overlooked Epistemic Reasons

Inquisitive Reasons

Inquisitive reasons

Inquisitive Reasons (Fleisher, 2022)

R is an **inquisitive reason** to perform an act ϕ iff R favors ϕ-ing in virtue of the fact that ϕ-ing is likely to promote successful inquiry (and to promote it in the right kind of way).

- I.e., reasons that concern promoting successful inquiry.
- Including reasons a hypothesis is worthy of pursuit
- Non-evidential epistemic reasons
  - Epistemic: because they promote successful inquiry
  - They might not increase the probability of the truth of H

Inquisitive reasons

Two types of inquisitive reasons: promise and social

Promise reasons:

Features of a theory (or hypothesis) which favor pursuing it because this pursuit will promote successful inquiry.

For example: testability, heuristic analogies, etc.

Social inquisitive reasons:

Features of the social context of inquiry that favor pursuing a theory (or hypothesis) because doing so will promote successful collective inquiry.

For example: promoting division of labor and productive debate, avoiding premature consensus

Why are inquisitive reasons important for expert judgment?

- Assessing whether a scientific claim should be accepted for the purposes of policy guidance requires:
  - sensitivity to the evidence in favor of that claim,
  - but also: sensitivity to the field of research that has produced the claim.
- Inquisitive reasons in favor of a rival theory are informative of potential defeaters of the dominant theory
- Inquisitive reasons in favor of the aerosol hypothesis were informative of the dominant view on the COVID-19 transmission

The WHO failed to take inquisitive reasons into account prior to July 2020

The pursuitworthiness of the aerosol hypothesis

Inquisitive reasons early in the pandemic

Analogy with the predecessor of COVID-19: SARS-CoV-1

SARS-CoV-1 spreads in the air (Morawska and Cao, 2020)

Analogy with other viral infections

(Morawska and Cao, 2020)

- Norwalk-like virus between school children
- influenza A/H5N1 virus between ferrets
- the WHO review of evidence from 2009: viral infectious diseases can be transmitted by aerosols

The pursuitworthiness of the aerosol hypothesis

Heuristic resource: direction for further inquiry

- The virus was found in aerosols in laboratory conditions (Van Doremalen et al., 2020).
- Attempts at culturing non-lab samples had been unsuccessful.
- But other experimental designs were possible, and were suggested by scientists.

Testability

Inquiring into the aerosol hypothesis was feasible given the variety of methods, providing this research line with a programmatic character.

But aren't HOE and inquisitive reasons already well-understood in scientific practice?

Lack of understanding of inquis. reasons and HOE

Krisch, 2020



LIVESCIENCE

Space Health Planet Earth Animals Archaeolog

TRENDING 'Quantum supremacy' record Maya underground structure

Health > Viruses, Infections & Disease > Coronavirus

Is the coronavirus airborne? Evidence is scant, infectious disease experts say

News By Joshua A. Krisch published July 8, 2020

A recent letter signed by 239 researchers claims that the novel coronavirus causing COVID-19 can spread through airborne microdroplets. Whether that matters is up for debate.

When you purchase through links on our site, we may earn an affiliate commission. Here's how it works.

But epidemiologists and infectious disease experts are wary of the limited evidence for airborne transmission, and concerned that recent media reports on this letter will do more harm than good. "It is a shame that they felt the need to publish," Paul Hunter, a professor at the University of East Anglia in the United Kingdom and a member of WHO's infection prevention committee, told Live Science. What's more, even if COVID-19 can spread via the airborne route, it's likely this happens only in limited circumstances and doesn't require additional precautions in most cases, experts said.

"Given the ample evidence that reducing droplet transmission works [to reduce COVID-19 spread], throwing other things into the mix only confuses people and undermines the World Health Organization at a critical time," Hunter said.

https://www.livescience.com/coronavirus-airborne-transmission-debate.html

Part of the confusion may stem from the fact that many of the signatories of the open letter are not infectious disease experts, but experts in fluid mechanics and the study of aerosols. And, while they understand how particles move through the air, their understanding of how those particles fuel disease spread, and the implications of this spread, may prove to have more academic significance than practical value in the midst of a global pandemic, according to Hunter. "Most of them are chemists, engineers, owners of ventilation companies," Hunter said. "They do not have a broad understanding of disease transmission mechanisms ... this issue is more nuanced than many of them realize."

Inquisitive reasons and HOE – not considered relevant.

So far: focus on individual expert judgment

- The upshot: expert judgment should be sensitive to these social-epistemic reasons
- But what does this mean for the collective decision-making?
- How should advisory boards aggregate those divided opinions into a policy recommendation?

Modeling Collective Decision-Making

The Decision Problem

- Binary threat state: Threat or No Threat (COVID-19 spreads through aerosols or it doesn't).
- A panel of experts submit probabilities for this event.

	threat	no threat
action	tp (catastrophe avoided)	fp (inconvenience cost)
no action	fn (catastrophe)	tn (neutral)

For instance . . . Covid-like scenarios

	threat	no threat
action	10	-5
no action	-100	0

Or:

	threat	no threat
action	1	-1
no action	-10	2

Which decision rule will allow for maximum utility over repeated decision-making scenarios?

An Agent-Based Model

- Panel of 5 experts submits threat probabilities:

$$p = [0.25,\ 0.30,\ 0.75,\ 0.80,\ 0.90]$$

- Ground truth revealed: Threat present (or not)
- expertise
- Utility matrix (e.g., Scenario 3):

Outcome	Value	Meaning
TP	+10	Catastrophe avoided
TN	0	Neutral (no threat)
FP	-5	Inconvenience cost
FN	-100	Catastrophe

Four Decision Strategies

Expected Utility-based:

- Expected Utility (EU): Act if $EU(\text{act}) > EU(\text{inact})$ using mean probability over experts
- Maximin EU (MMEU): Act if worst-case EU over $[p_{\min}, p_{\max}]$ favors action

$$\min_{p \in [p_{\min}, p_{\max}]} EU(p, \text{act}) > \min_{p \in [p_{\min}, p_{\max}]} EU(p, \text{inact}).$$

Four Decision Strategies

Expected Utility-based:

- Expected Utility (EU): Act if $EU(\text{act}) > EU(\text{inact})$ using mean probability over experts
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$$\min_{p \in [p_{\min}, p_{\max}]} EU(p, \text{act}) > \min_{p \in [p_{\min}, p_{\max}]} EU(p, \text{inact}).$$

'Rule-of-thumb':

- Majority (Maj): Act if $\bar{p}_t > 0.4$
- Inclusion (Inc): Act if $\max_i p_{i,t} > 0.6$

Different scenarios

- **Scenarios 1–4:**

Scenario	TP	TN	FP	FN	*description*
1	1	2	-1	-10	*Covid-like scenario*
2	1	2	-5	-10	*Variant of 1*
3	10	0	-5	-100	*Covid-like scenario*
4	10	0	-50	-100	*Variant of 3*

- **Scenario 5:** Randomized utilities satisfying $U_{TP} \geq U_{TN} \geq 0 \geq U_{FP} \geq U_{FN}$, ensuring rational preference ordering while exploring unstructured parameter space.

Introducing trust

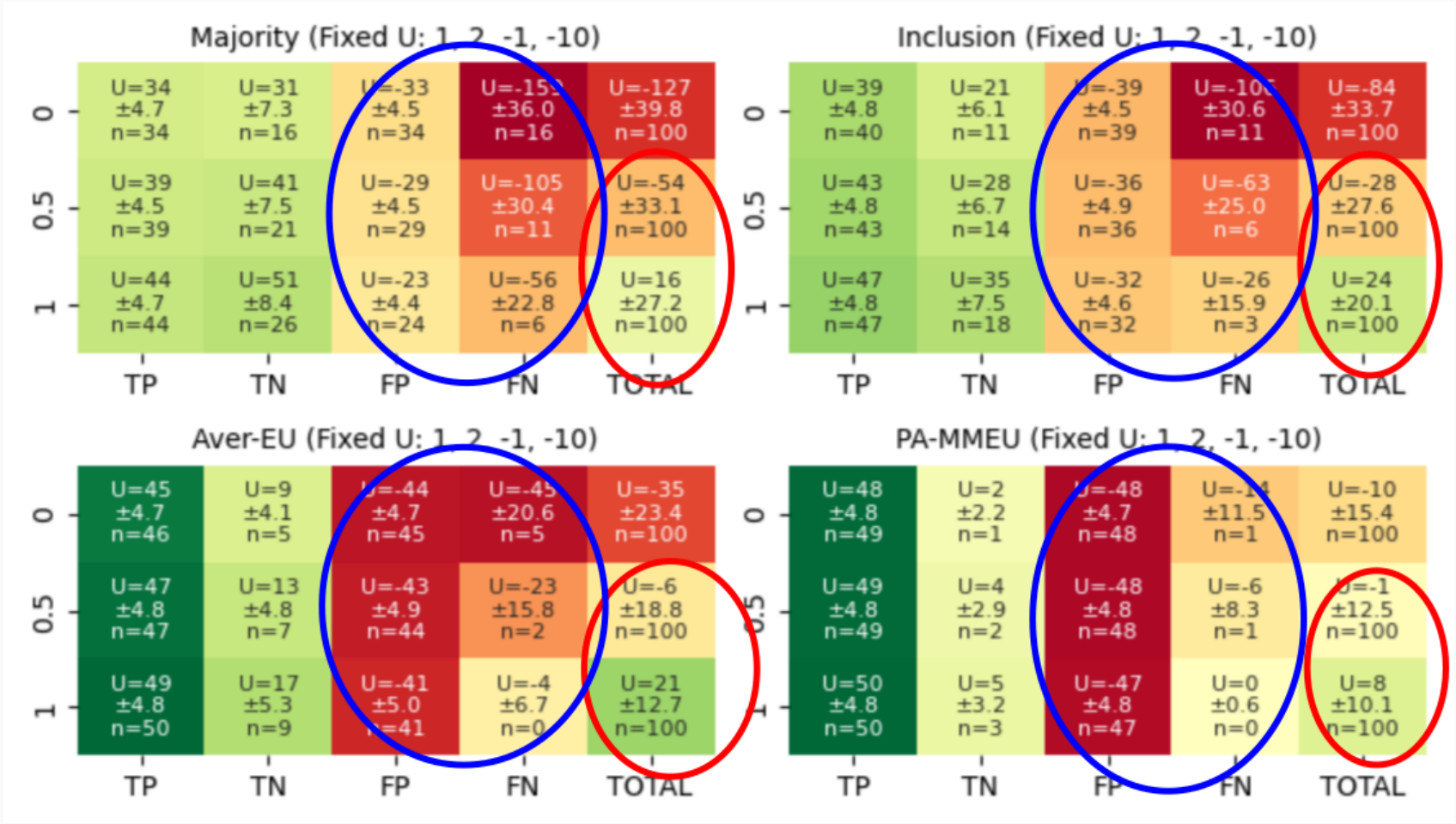
Utility and Trust

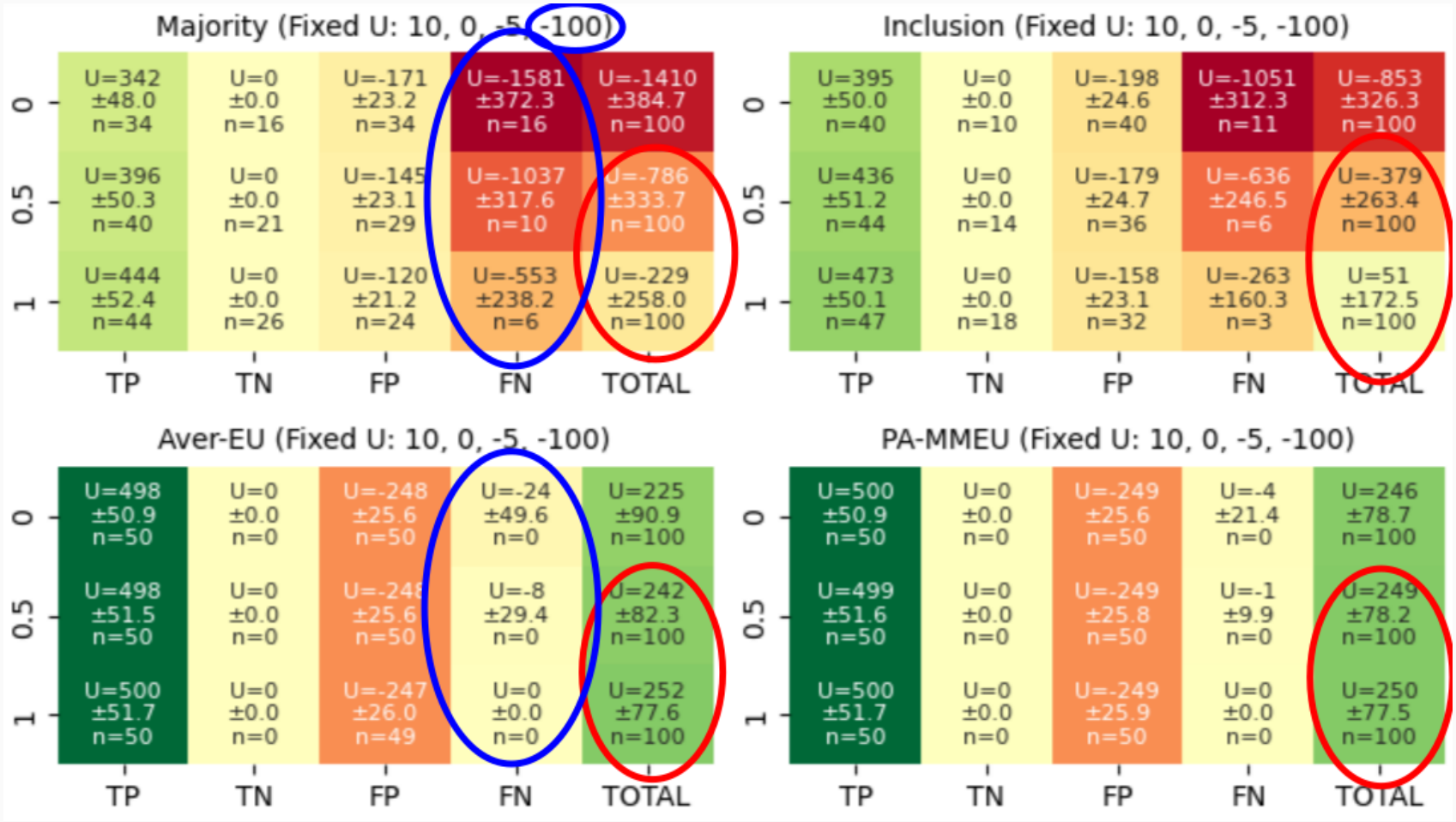
Is there a tradeoff between maximizing utility and maximizing public trust in science?

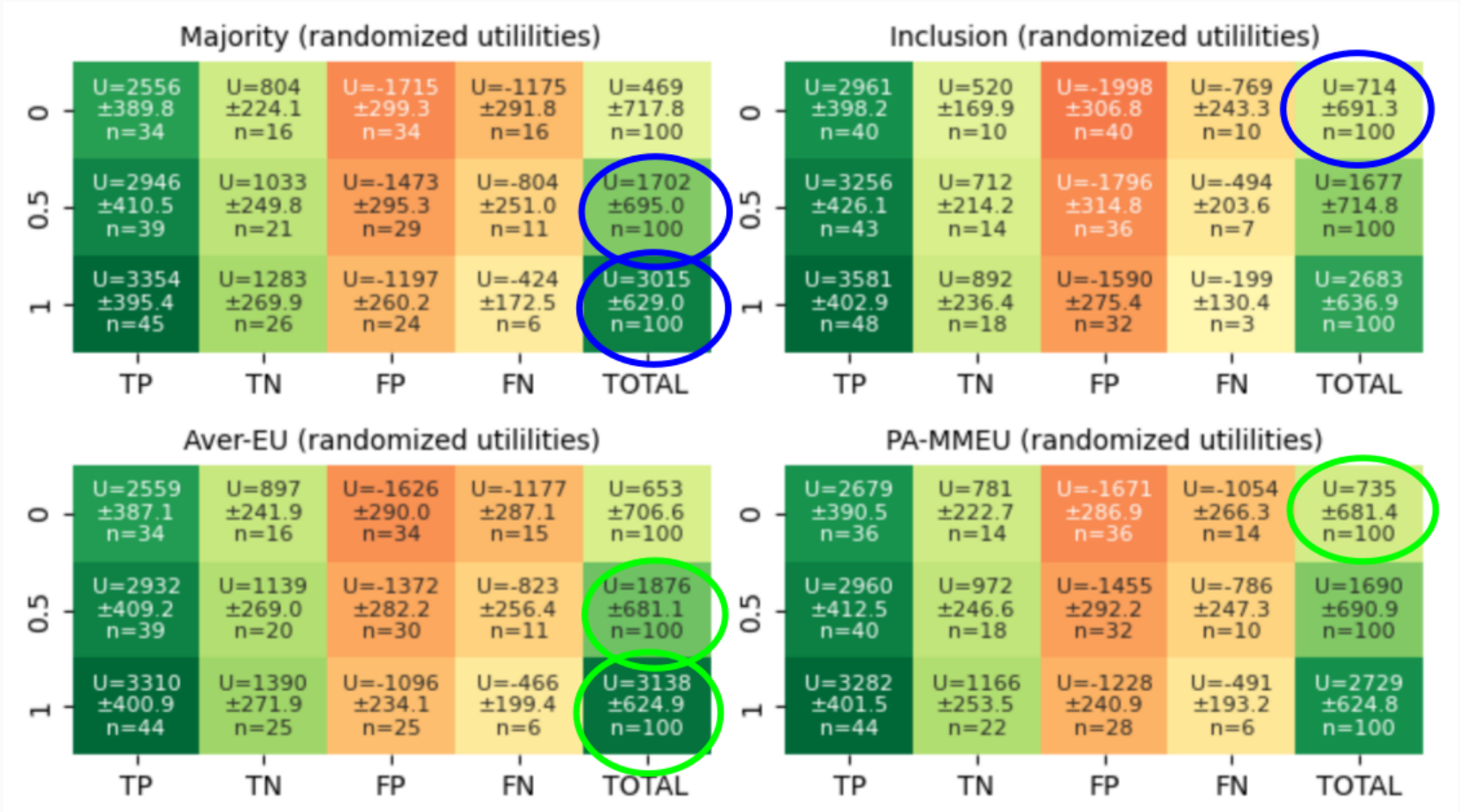
- The correct recommendation increases trust
- Incorrect recommendation decreases trust.

The simulation

- 1,000 rounds x 5 utility scenarios x 3 reliability levels
- We vary the degree of competence that the majority experts have (expert truth-tracking).
- We measure:
  - the utility resulting from each strategy
  - its impact on public trust in science.

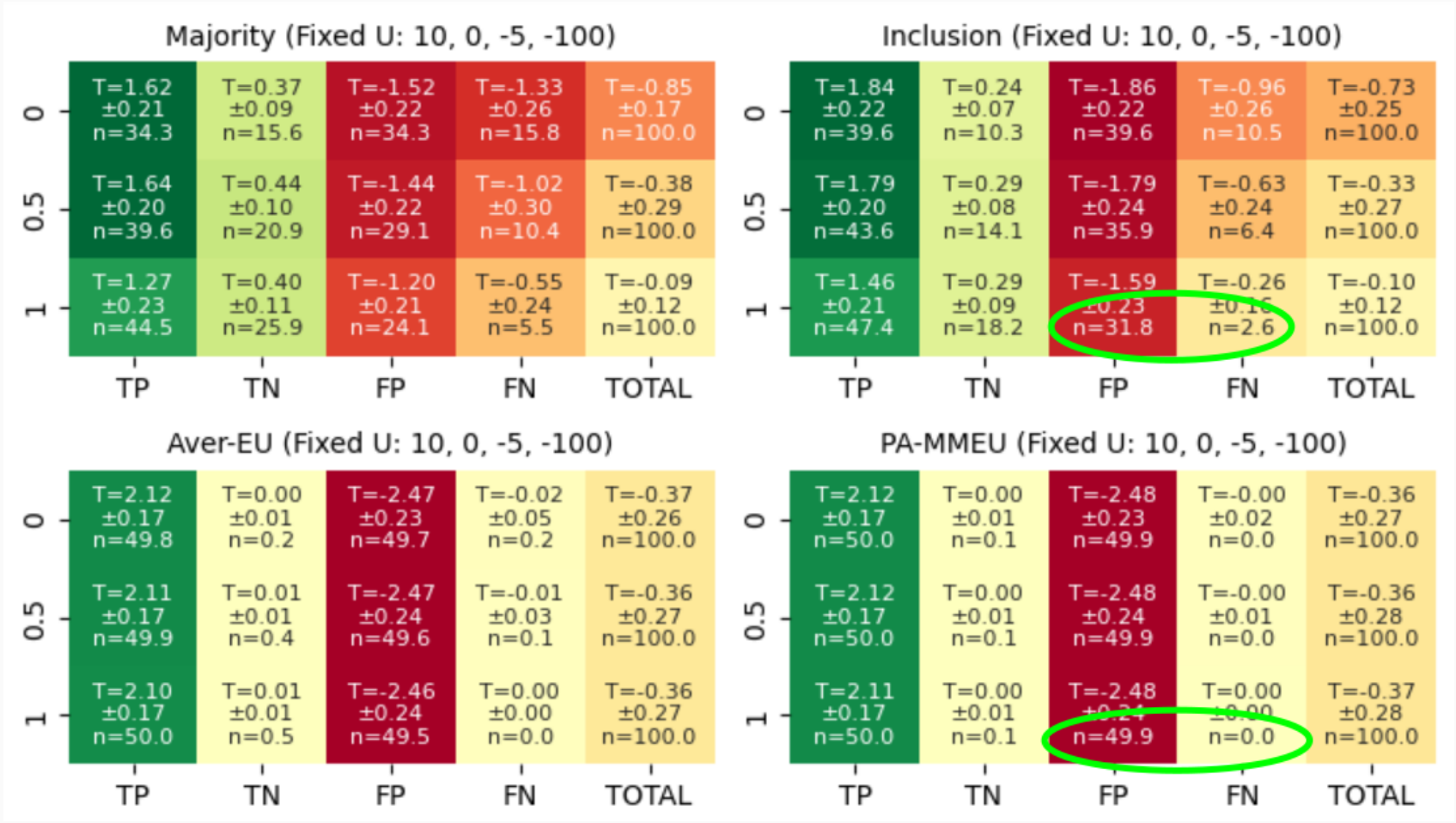

Majority (Fixed U: 1, 2, -1, -10)
Inclusion (Fixed U: 1, 2, -1, -10)
Aver-EU (Fixed U: 1, 2, -1, -10)
PA-MMEU (Fixed U: 1, 2, -1, -10)
0
0.5
1
TP
TN
FP
FN
TOTAL


Majority (Fixed U: 10, 0, -5, -100)
U=342 ±48.0 n=34
U=0 ±0.0 n=16
U=-171 ±23.2 n=34
U=-1581 ±372.3 n=16
U=-1410 ±384.7 n=100
U=396 ±50.3 n=40
U=0 ±0.0 n=21
U=-145 ±23.1 n=29
U=-1037 ±317.6 n=10
U=-786 ±333.7 n=100
U=444 ±52.4 n=44
U=0 ±0.0 n=26
U=-120 ±21.2 n=24
U=-553 ±238.2 n=6
U=-229 ±258.0 n=100
Inclusion (Fixed U: 10, 0, -5, -100)
U=395 ±50.0 n=40
U=0 ±0.0 n=10
U=-198 ±24.6 n=40
U=-1051 ±312.3 n=11
U=-853 ±326.3 n=100
U=436 ±51.2 n=44
U=0 ±0.0 n=14
U=-179 ±24.7 n=36
U=-636 ±246.5 n=6
U=-379 ±263.4 n=100
U=473 ±50.1 n=47
U=0 ±0.0 n=18
U=-158 ±23.1 n=32
U=-263 ±160.3 n=3
U=51 ±172.5 n=100
Aver-EU (Fixed U: 10, 0, -5, -100)
U=498 ±50.9 n=50
U=0 ±0.0 n=0
U=-248 ±25.6 n=50
U=-24 ±49.6 n=0
U=225 ±90.9 n=100
U=498 ±51.5 n=50
U=0 ±0.0 n=0
U=-248 ±25.6 n=50
U=-8 ±29.4 n=0
U=242 ±82.3 n=100
U=500 ±51.7 n=50
U=0 ±0.0 n=0
U=-247 ±26.0 n=49
U=0 ±0.0 n=0
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U=-249 ±25.6 n=50
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U=246 ±78.7 n=100
U=499 ±51.6 n=50
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U=-249 ±25.8 n=50
U=-1 ±9.9 n=0
U=249 ±78.2 n=100
U=500 ±51.7 n=50
U=0 ±0.0 n=0
U=-249 ±25.9 n=50
U=0 ±0.0 n=0
U=250 ±77.5 n=100
0
0.5
1
TP
TN
FP
FN
TOTAL


Majority (randomized utililities)
U=2556 ±389.8 n=34
U=804 ±224.1 n=16
U=-1715 ±299.3 n=34
U=-1175 ±291.8 n=16
U=469 ±717.8 n=100
U=2946 ±410.5 n=39
U=1033 ±249.8 n=21
U=-1473 ±295.3 n=29
U=-804 ±251.0 n=11
U=1702 ±695.0 n=100
U=3354 ±395.4 n=45
U=1283 ±269.9 n=26
U=-1197 ±260.2 n=24
U=-424 ±172.5 n=6
U=3015 ±629.0 n=100
0
0.5
1
TP
TN
FP
FN
TOTAL
Inclusion (randomized utililities)
U=2961 ±398.2 n=40
U=520 ±169.9 n=10
U=-1998 ±306.8 n=40
U=-769 ±243.3 n=10
U=714 ±691.3 n=100
U=3256 ±426.1 n=43
U=712 ±214.2 n=14
U=-1796 ±314.8 n=36
U=-494 ±203.6 n=7
U=1677 ±714.8 n=100
U=3581 ±402.9 n=48
U=892 ±236.4 n=18
U=-1590 ±275.4 n=32
U=-199 ±130.4 n=3
U=2683 ±636.9 n=100
0
0.5
1
TP
TN
FP
FN
TOTAL
Aver-EU (randomized utililities)
U=2559 ±387.1 n=34
U=897 ±241.9 n=16
U=-1626 ±290.0 n=34
U=-1177 ±287.1 n=15
U=653 ±706.6 n=100
U=2932 ±409.2 n=39
U=1139 ±269.0 n=20
U=-1372 ±282.2 n=30
U=-823 ±256.4 n=11
U=1876 ±681.1 n=100
U=3310 ±400.9 n=44
U=1390 ±271.9 n=25
U=-1096 ±234.1 n=25
U=-466 ±199.4 n=6
U=3138 ±624.9 n=100
0
0.5
1
TP
TN
FP
FN
TOTAL
PA-MMEU (randomized utililities)
U=2679 ±390.5 n=36
U=781 ±222.7 n=14
U=-1671 ±286.9 n=36
U=-1054 ±266.3 n=14
U=735 ±681.4 n=100
U=2960 ±412.5 n=40
U=972 ±246.6 n=18
U=-1455 ±292.2 n=32
U=-786 ±247.3 n=10
U=1690 ±690.9 n=100
U=3282 ±401.5 n=44
U=1166 ±253.5 n=22
U=-1228 ±240.9 n=28
U=-491 ±193.2 n=6
U=2729 ±624.8 n=100
0
0.5
1
TP
TN
FP
FN
TOTAL

Result 1: Utility Performance Across Conditions

- No universally dominant strategy
- MMEU excels under low expertise
- EU dominates under high expertise

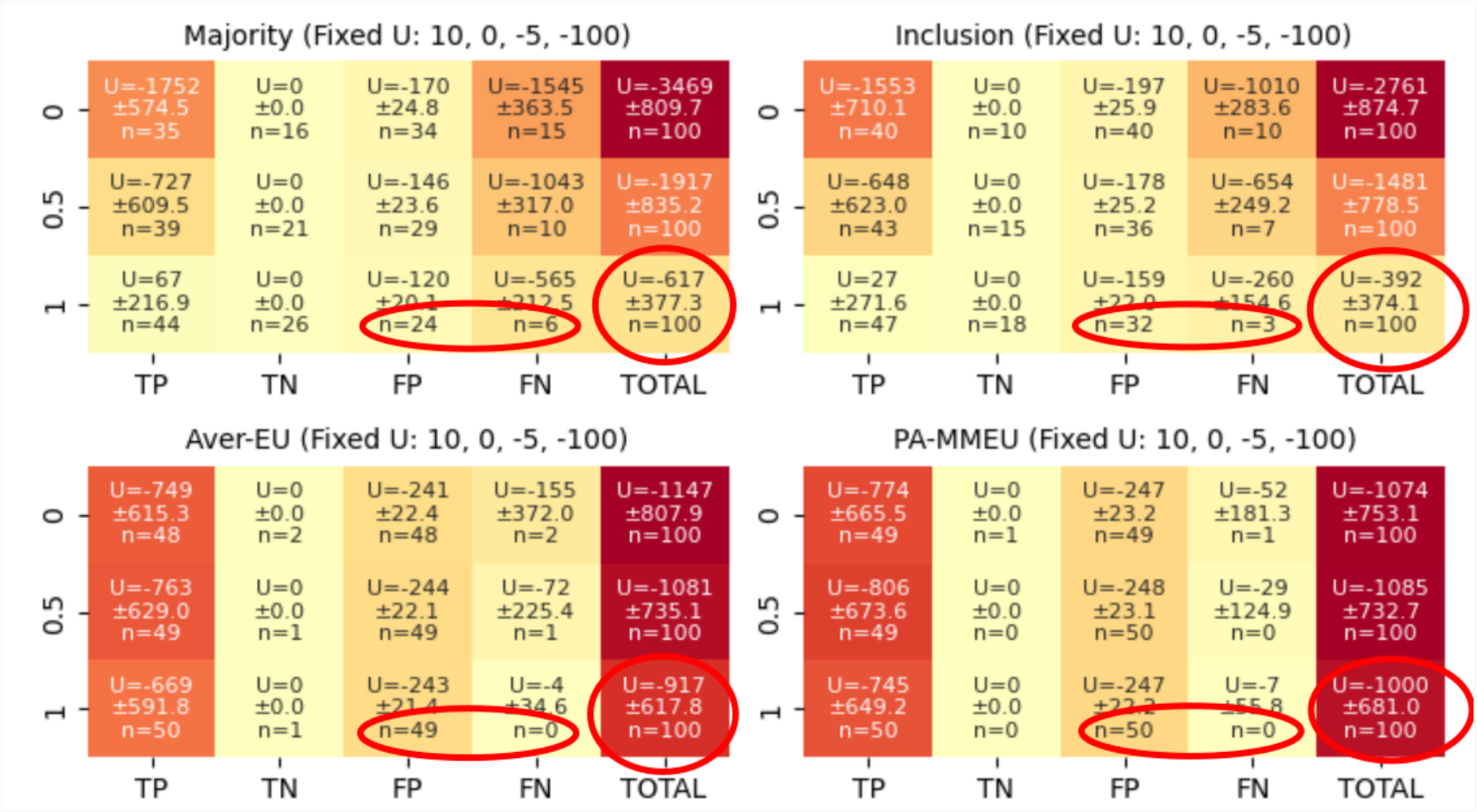

Majority (Fixed U: 10, 0, -5, -100)
0
0.5
1
T=1.62 ±0.21 n=34.3
T=0.37 ±0.09 n=15.6
T=-1.52 ±0.22 n=34.3
T=-1.33 ±0.26 n=15.8
T=-0.85 ±0.17 n=100.0
T=1.64 ±0.20 n=39.6
T=0.44 ±0.10 n=20.9
T=-1.44 ±0.22 n=29.1
T=-1.02 ±0.30 n=10.4
T=-0.38 ±0.29 n=100.0
T=1.27 ±0.23 n=44.5
T=0.40 ±0.11 n=25.9
T=-1.20 ±0.21 n=24.1
T=-0.55 ±0.24 n=5.5
T=-0.09 ±0.12 n=100.0
TP
TN
FP
FN
TOTAL
Inclusion (Fixed U: 10, 0, -5, -100)
0
0.5
1
T=1.84 ±0.22 n=39.6
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T=-1.86 ±0.22 n=39.6
T=-0.96 ±0.26 n=10.5
T=-0.73 ±0.25 n=100.0
T=1.79 ±0.20 n=43.6
T=0.29 ±0.08 n=14.1
T=-1.79 ±0.24 n=35.9
T=-0.63 ±0.24 n=6.4
T=-0.33 ±0.27 n=100.0
T=1.46 ±0.21 n=47.4
T=0.29 ±0.09 n=18.2
T=-1.59 ±0.23 n=31.8
T=-0.26 ±0.16 n=2.6
T=-0.10 ±0.12 n=100.0
TP
TN
FP
FN
TOTAL
Aver-EU (Fixed U: 10, 0, -5, -100)
0
0.5
1
T=2.12 ±0.17 n=49.8
T=0.00 ±0.01 n=0.2
T=-2.47 ±0.23 n=49.7
T=-0.02 ±0.05 n=0.2
T=-0.37 ±0.26 n=100.0
T=2.11 ±0.17 n=49.9
T=0.01 ±0.01 n=0.4
T=-2.47 ±0.24 n=49.6
T=-0.01 ±0.03 n=0.1
T=-0.36 ±0.27 n=100.0
T=2.10 ±0.17 n=50.0
T=0.01 ±0.01 n=0.5
T=-2.46 ±0.24 n=49.5
T=0.00 ±0.00 n=0.0
T=-0.36 ±0.27 n=100.0
TP
TN
FP
FN
TOTAL
PA-MMEU (Fixed U: 10, 0, -5, -100)
0
0.5
1
T=2.12 ±0.17 n=50.0
T=0.00 ±0.01 n=0.1
T=-2.48 ±0.23 n=49.9
T=-0.00 ±0.02 n=0.0
T=-0.36 ±0.27 n=100.0
T=2.12 ±0.17 n=50.0
T=0.00 ±0.01 n=0.1
T=-2.48 ±0.24 n=49.9
T=-0.00 ±0.01 n=0.0
T=-0.36 ±0.28 n=100.0
T=2.11 ±0.17 n=50.0
T=0.00 ±0.01 n=0.1
T=-2.48 ±0.24 n=49.9
T=0.00 ±0.00 n=0.0
T=-0.37 ±0.28 n=100.0
TP
TN
FP
FN
TOTAL

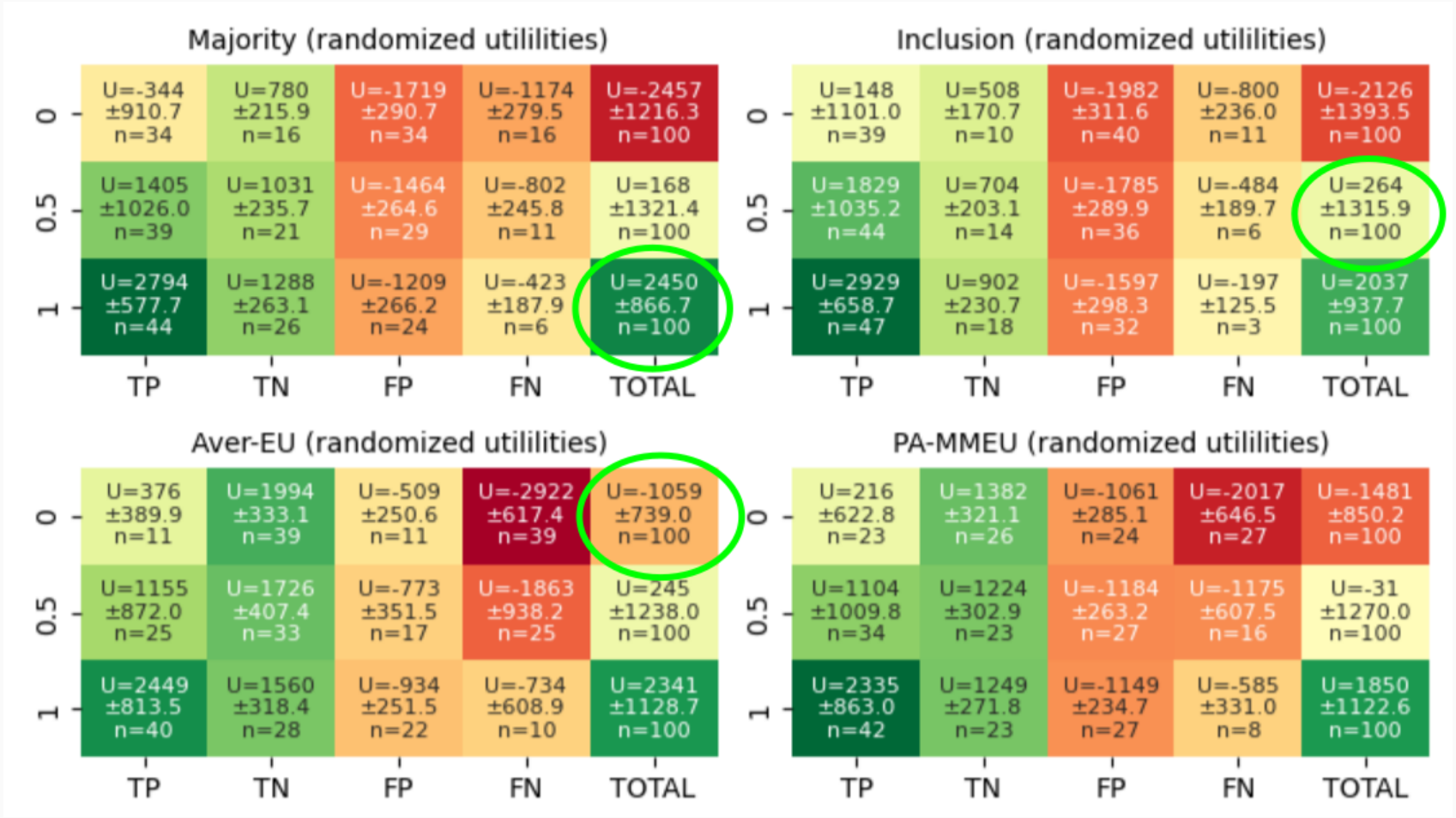
Result 2: The Accuracy-Credibility Trade-off

- EU is highly precautionary $\rightarrow$ avoids catastrophes but generates many false alarms
- This results in a rapid trust erosion
- Inclusion preserves trust if experts are highly competent

Dynamic Model

Decrease in Trust leads to less less effective interventions and therefore to utility loss


Majority (Fixed U: 10, 0, -5, -100)
0
0.5
1
U=-1752 ±574.5 n=35
U=0 ±0.0 n=16
U=-170 ±24.8 n=34
U=-1545 ±363.5 n=15
U=-3469 ±809.7 n=100
U=-727 ±609.5 n=39
U=0 ±0.0 n=21
U=-146 ±23.6 n=29
U=-1043 ±317.0 n=10
U=-1917 ±835.2 n=100
U=67 ±216.9 n=44
U=0 ±0.0 n=26
U=-120 ±20.1 n=24
U=-565 ±312.5 n=6
U=-617 ±377.3 n=100
TP
TN
FP
FN
TOTAL
Inclusion (Fixed U: 10, 0, -5, -100)
0
0.5
1
U=-1553 ±710.1 n=40
U=0 ±0.0 n=10
U=-197 ±25.9 n=40
U=-1010 ±283.6 n=10
U=-2761 ±874.7 n=100
U=-648 ±623.0 n=43
U=0 ±0.0 n=15
U=-178 ±25.2 n=36
U=-654 ±249.2 n=7
U=-1481 ±778.5 n=100
U=27 ±271.6 n=47
U=0 ±0.0 n=18
U=-159 ±22.0 n=32
U=-260 ±154.6 n=3
U=-392 ±374.1 n=100
TP
TN
FP
FN
TOTAL
Aver-EU (Fixed U: 10, 0, -5, -100)
0
0.5
1
U=-749 ±615.3 n=48
U=0 ±0.0 n=2
U=-241 ±22.4 n=48
U=-155 ±372.0 n=2
U=-1147 ±807.9 n=100
U=-763 ±629.0 n=49
U=0 ±0.0 n=1
U=-244 ±22.1 n=49
U=-72 ±225.4 n=1
U=-1081 ±735.1 n=100
U=-669 ±591.8 n=50
U=0 ±0.0 n=1
U=-243 ±21.4 n=49
U=-4 ±34.6 n=0
U=-917 ±617.8 n=100
TP
TN
FP
FN
TOTAL
PA-MMEU (Fixed U: 10, 0, -5, -100)
0
0.5
1
U=-774 ±665.5 n=49
U=0 ±0.0 n=1
U=-247 ±23.2 n=49
U=-52 ±181.3 n=1
U=-1074 ±753.1 n=100
U=-806 ±673.6 n=49
U=0 ±0.0 n=0
U=-248 ±23.1 n=50
U=-29 ±124.9 n=0
U=-1085 ±732.7 n=100
U=-745 ±649.2 n=50
U=0 ±0.0 n=0
U=-247 ±22.2 n=50
U=-7 ±55.8 n=0
U=-1000 ±681.0 n=100
TP
TN
FP
FN
TOTAL


Majority (randomized utililities)
0
0.5
1
U=-344 ±910.7 n=34
U=780 ±215.9 n=16
U=-1719 ±290.7 n=34
U=-1174 ±279.5 n=16
U=-2457 ±1216.3 n=100
U=1405 ±1026.0 n=39
U=1031 ±235.7 n=21
U=-1464 ±264.6 n=29
U=-802 ±245.8 n=11
U=168 ±1321.4 n=100
U=2794 ±577.7 n=44
U=1288 ±263.1 n=26
U=-1209 ±266.2 n=24
U=-423 ±187.9 n=6
U=2450 ±866.7 n=100
TP
TN
FP
FN
TOTAL
Inclusion (randomized utililities)
0
0.5
1
U=148 ±1101.0 n=39
U=508 ±170.7 n=10
U=-1982 ±311.6 n=40
U=-800 ±236.0 n=11
U=-2126 ±1393.5 n=100
U=1829 ±1035.2 n=44
U=704 ±203.1 n=14
U=-1785 ±289.9 n=36
U=-484 ±189.7 n=6
U=264 ±1315.9 n=100
U=2929 ±658.7 n=47
U=902 ±230.7 n=18
U=-1597 ±298.3 n=32
U=-197 ±125.5 n=3
U=2037 ±937.7 n=100
TP
TN
FP
FN
TOTAL
Aver-EU (randomized utililities)
0
0.5
1
U=376 ±389.9 n=11
U=1994 ±333.1 n=39
U=-509 ±250.6 n=11
U=-2922 ±617.4 n=39
U=-1059 ±739.0 n=100
U=1155 ±872.0 n=25
U=1726 ±407.4 n=33
U=-773 ±351.5 n=17
U=-1863 ±938.2 n=25
U=245 ±1238.0 n=100
U=2449 ±813.5 n=40
U=1560 ±318.4 n=28
U=-934 ±251.5 n=22
U=-734 ±608.9 n=10
U=2341 ±1128.7 n=100
TP
TN
FP
FN
TOTAL
PA-MMEU (randomized utililities)
0
0.5
1
U=216 ±622.8 n=23
U=1382 ±321.1 n=26
U=-1061 ±285.1 n=24
U=-2017 ±646.5 n=27
U=-1481 ±850.2 n=100
U=1104 ±1009.8 n=34
U=1224 ±302.9 n=23
U=-1184 ±263.2 n=27
U=-1175 ±607.5 n=16
U=-31 ±1270.0 n=100
U=2335 ±863.0 n=42
U=1249 ±271.8 n=23
U=-1149 ±234.7 n=27
U=-585 ±331.0 n=8
U=1850 ±1122.6 n=100
TP
TN
FP
FN
TOTAL

Take-away

- Which strategy is the best is highly context dependent
- There is a trade-off between maximizing success of policy application (utility) and public trust in science.
- The value of the model?
  - It explains the emergence of such a trade-off
  - A robustness check for existing normative proposals.

Conclusion

In this talk we have argued

- Expert judgment should be based on a broader set of epistemic reasons
- A simplified evidentialist approach to expertise omits some of the relevant epistemic reasons, such as:
  - higher-order evidence
  - inquisitive reasons
- Each should inform expert recommendations depending on their relative strength

Relevance of our account

- Deeper understanding of expertise and its social epistemic character
- Deeper understanding of problematic cases involving expertise (such as epistemic trespassing and calls to 'DYOR!')
- Beyond the discussion on expertise: epistemic reasons relevant for science journalism and fact-checking of scientific claims.

Our model

- Shows challenges for collective decision-making in such circumstances.
- Finding a decision procedure that is superior across various circumstances isn't going to be easy.
- A lot depends on the reliability of experts
- Even if we find a procedure that maximizes utility, it might backfire with respect to public trust in science.

Thank you!

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