universität innsbruck

Building support for carbon pricing

TWO RESEARCH PROJECTS

01 **Many Designs**

55 experimental designs · U.S.

02 **Austria's carbon dividend**

Policy knowledge and support



Rene Schwaiger

University of Innsbruck

Lab Meeting · The Hong Kong Polytechnic University

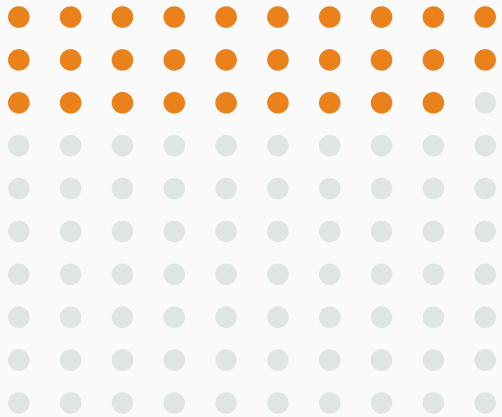
18 November 2026

Carbon pricing remains underused and needs public support

GLOBAL REACH · 2026

29%

of global greenhouse gas emissions are covered by a direct carbon price



World Bank (2026)
State and Trends of Carbon Pricing.
Coverage as of 1 April 2026.

Evidence of lower emissions

An 80-study meta-analysis finds reductions across multiple pricing schemes.

Döbbeling-Hildebrandt et al. (2024)

Lower-cost abatement

A common carbon price encourages reductions where they cost less.

IPCC (2022), §13.6.3.3

Carbon taxes often lack majority support

Will it work? Who pays? Is it fair?

Effectiveness, household costs and distributional concerns shape support.

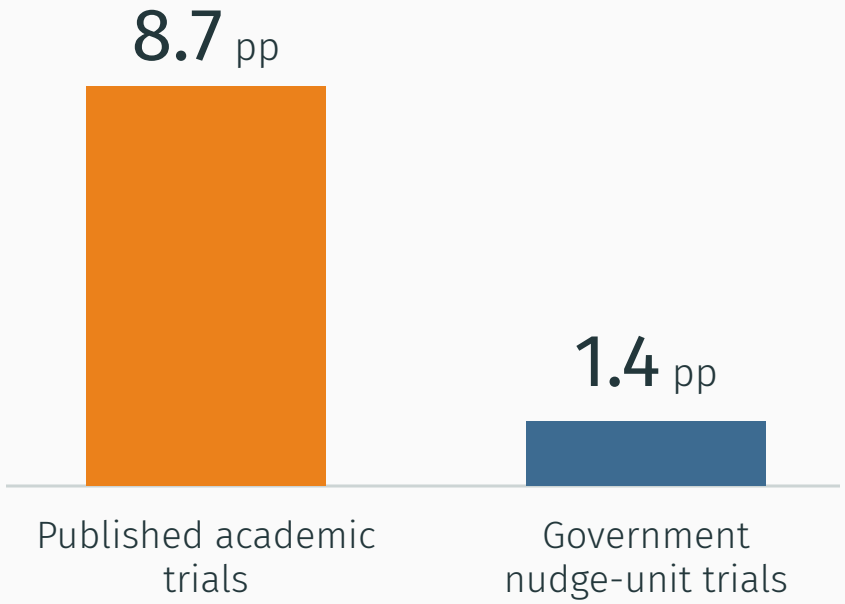
Dechezleprêtre et al. (2025)

Public support helps make broad climate policies politically feasible and durable.

Can behavioral interventions change individual behavior?

BEHAVIORAL TAKE-UP · CROSS-DOMAIN TRIALS

Published academic and government trials



Behavioral outcomes, not policy-support estimates.
Average take-up change in percentage points.
Different trial samples and interventions; not a matched comparison.

DellaVigna & Linos (2022)

Smaller effects in government nudge-unit trials

Government trials use much larger samples.
Selective publication can inflate published estimates.

DellaVigna & Linos (2022); Mertens et al. (2022); Maier et al. (2022)

The gap: consequential policy support

In these large climate experiments, consequential behavior concerns broader climate action; carbon-pricing support is self-reported.

Vlasceanu et al. (2024); Dechezleprêtre et al. (2025)

Our contribution: **consequential carbon-pricing support** across 55 independently designed experiments.

Can behavioral interventions increase consequential support for carbon pricing?

01 · MANY DESIGNS

Fifty-five crowd-sourced designs assessing carbon pricing support in the U.S.

Armando Holzknecht, **Rene Schwaiger**, Esther Blanco,
Juergen Huber and Michael Kirchler

with 108 co-authors across 55 research teams

Project website
manydesignscarbon.online

Preregistration & materials
osf.io/ujvdn

The first many-designs study of carbon-pricing support

55 independent studies · 19,558 US participants

POLICY EVIDENCE

01 Consequential policy support

Measure actions supporting carbon pricing: donations, petitions and political contact.

02 Comparing behavioral measures

Develop consequential support measures and examine how effects vary across them.

03 Policy-relevant effect sizes

Estimate average effects on consequential support and five common stated-support outcomes.

META-SCIENCE

04 Independent studies, faster evidence

55 full experiments with separate controls and participants build evidence in parallel.

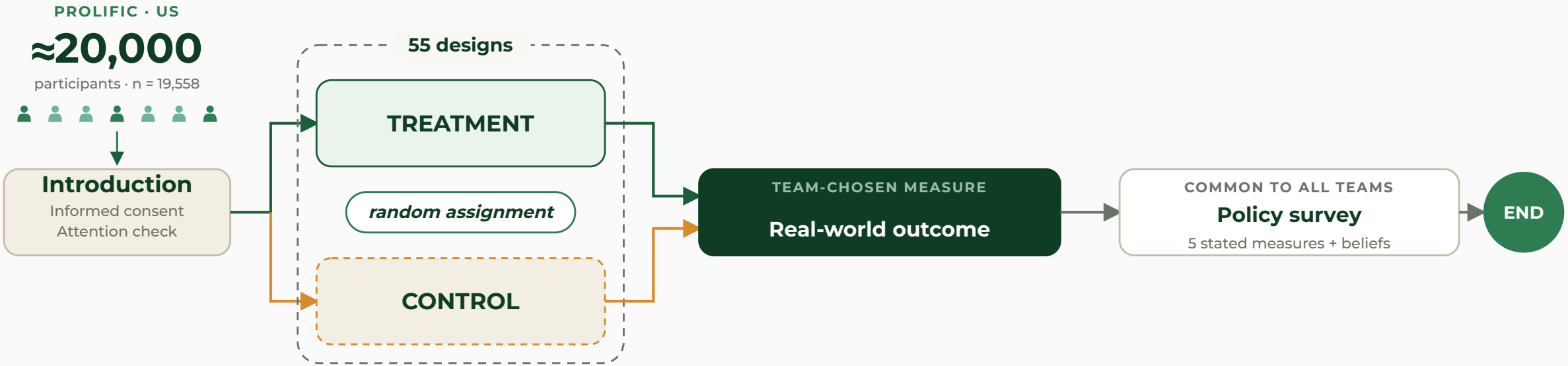
05 Heterogeneity across designs

Common recruitment pool + common analysis → Quantify variation across study designs.

06 Complete reporting + forecasts

All 55 designs reported → **no publication bias within this set.** Test researcher forecasts.

Experimental protocol



RESEARCH-TEAM (RT) ASSESSMENTS

collected up front — about a team's own design, and about ten peer designs

SELF-ASSESSMENT

own design

How large do you expect the effect size of your intervention to be?

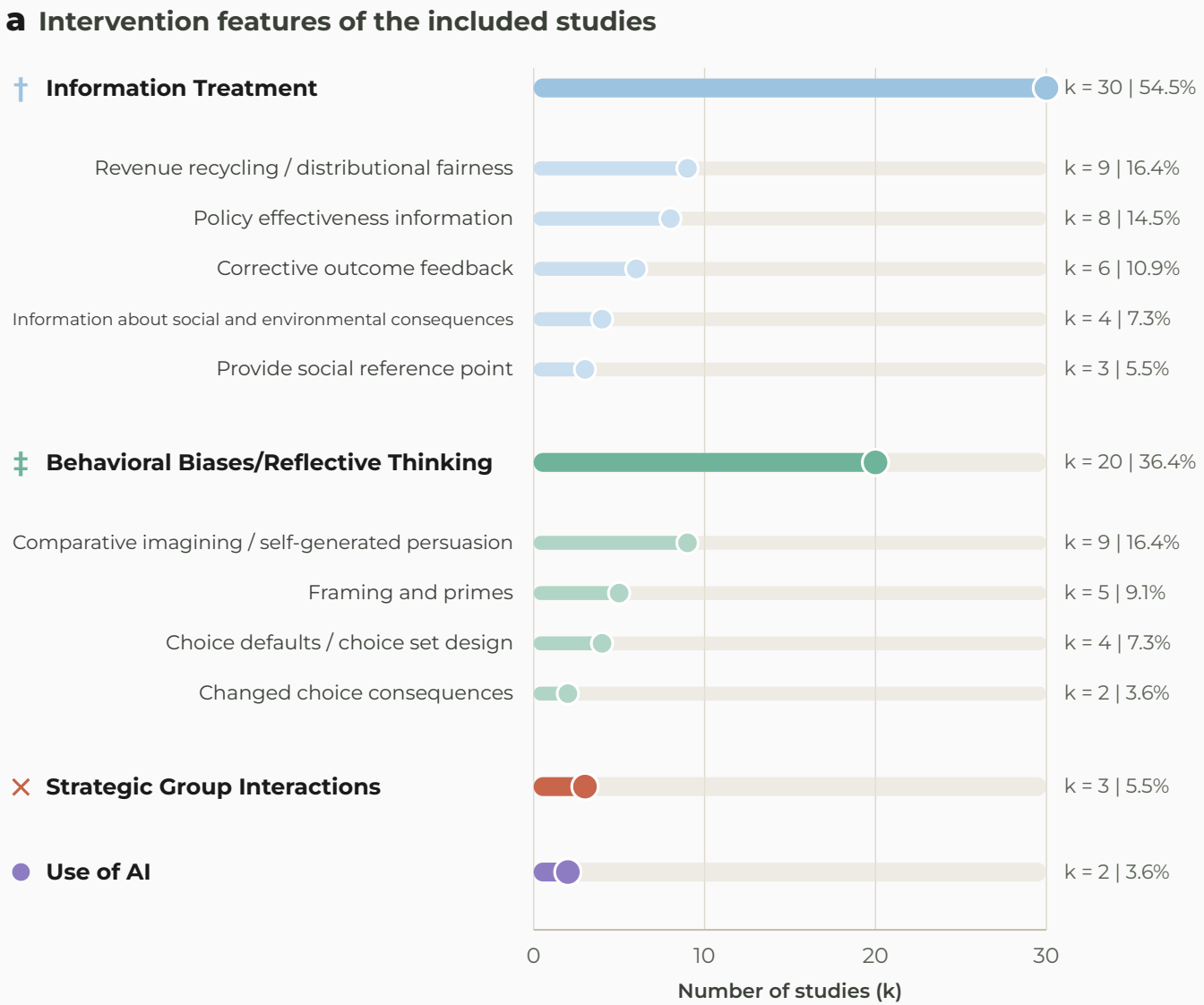
(Cohen's d)

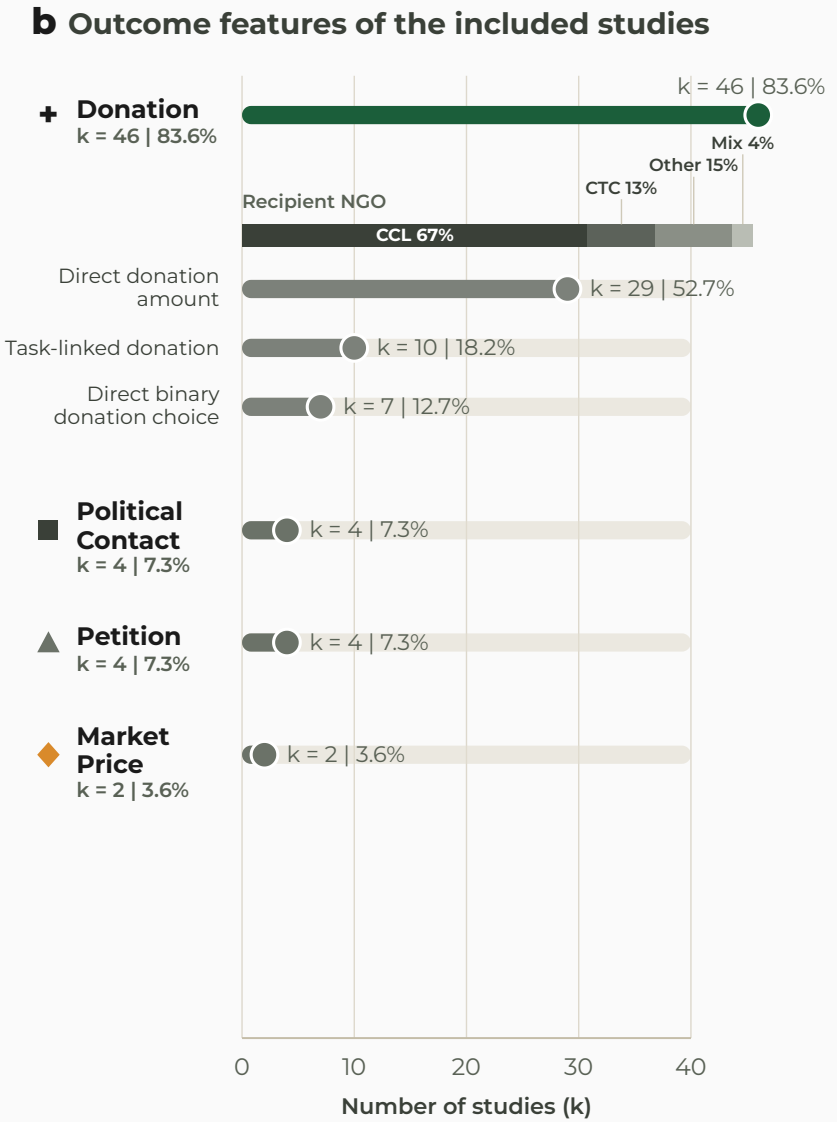
PEER-ASSESSMENT

each team rated 10 other designs

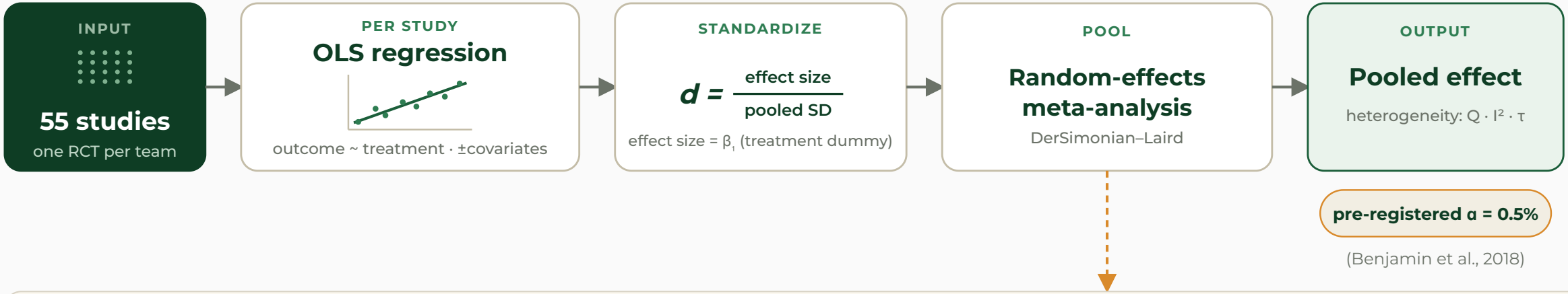
- How large do you expect this design's effect size to be? (Cohen's d)
- How informative is the design for the research question? (0–10)
- Which behavioral-intervention category does it fall under?

What the 55 teams designed

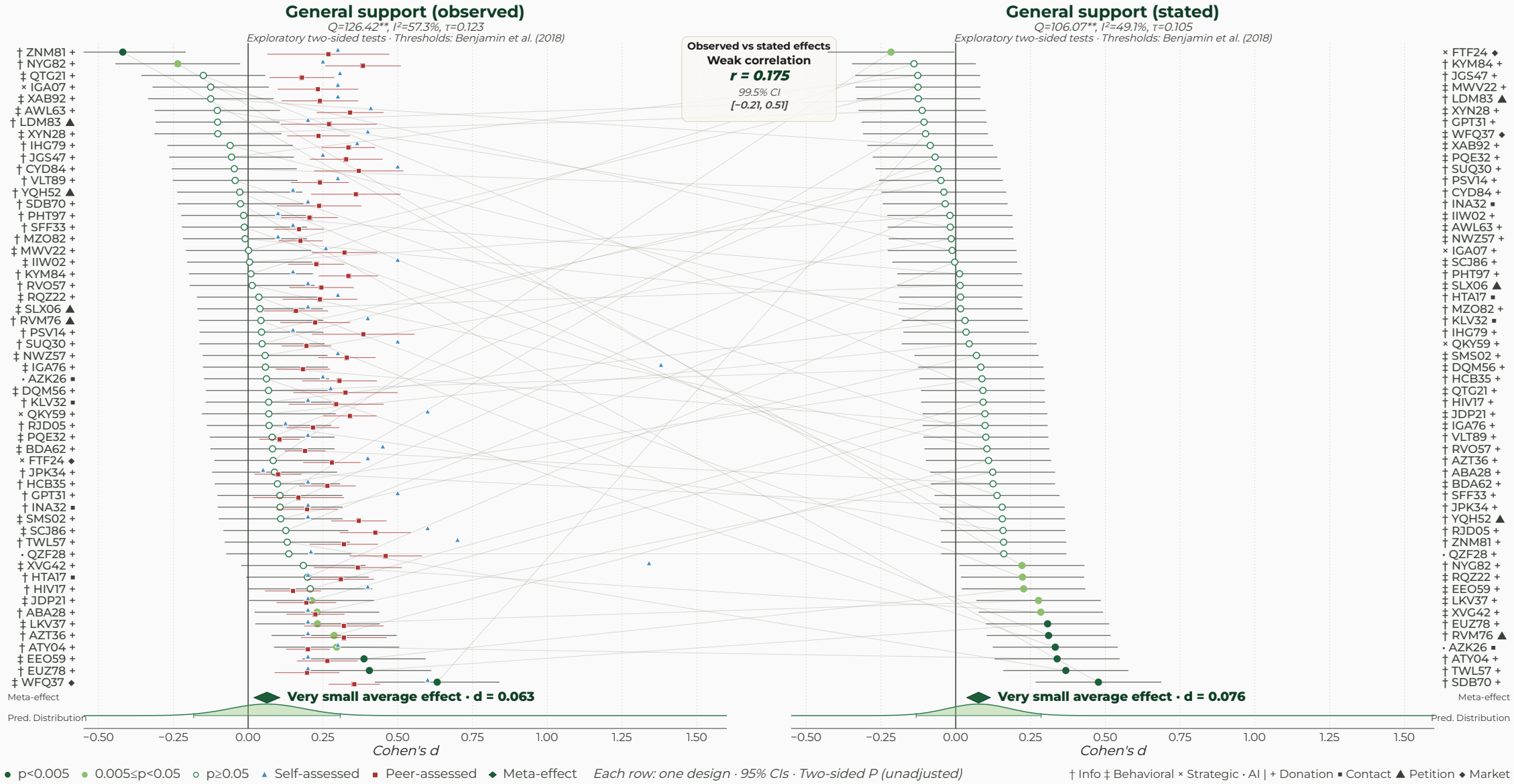




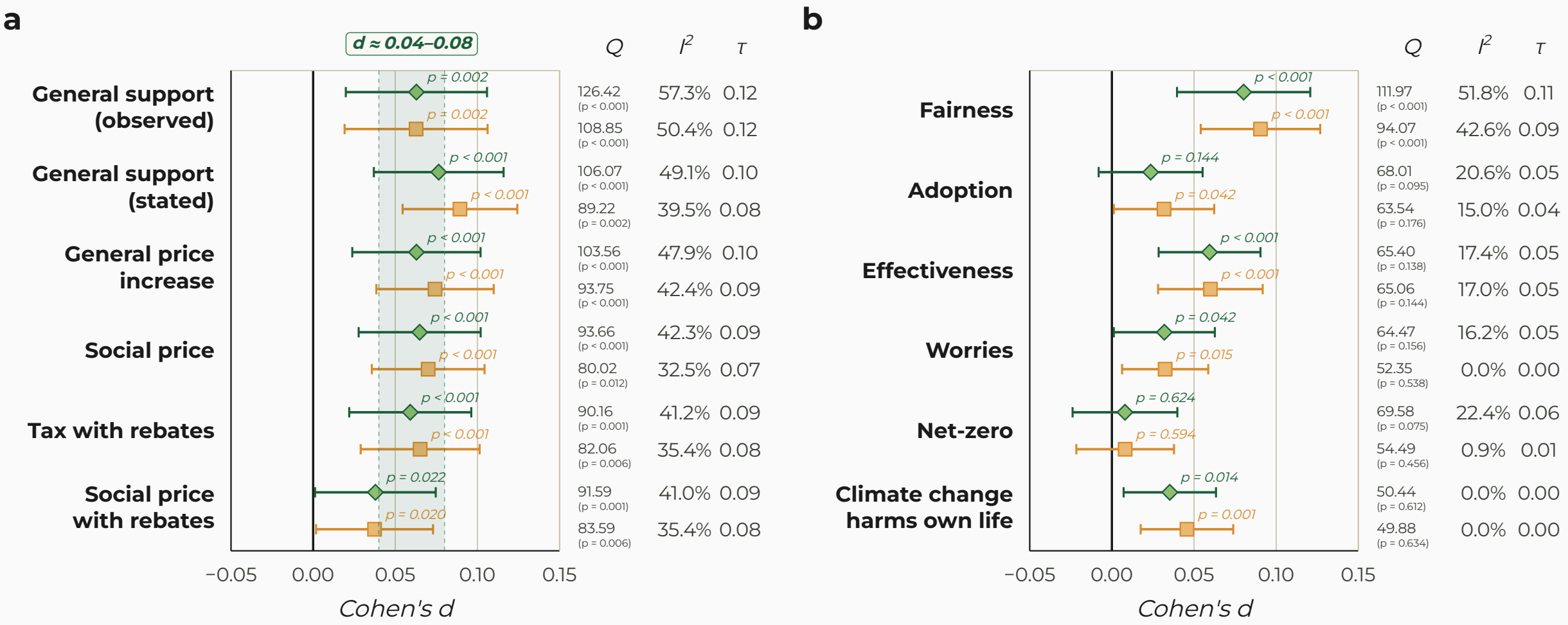
From 55 studies to a pooled estimate



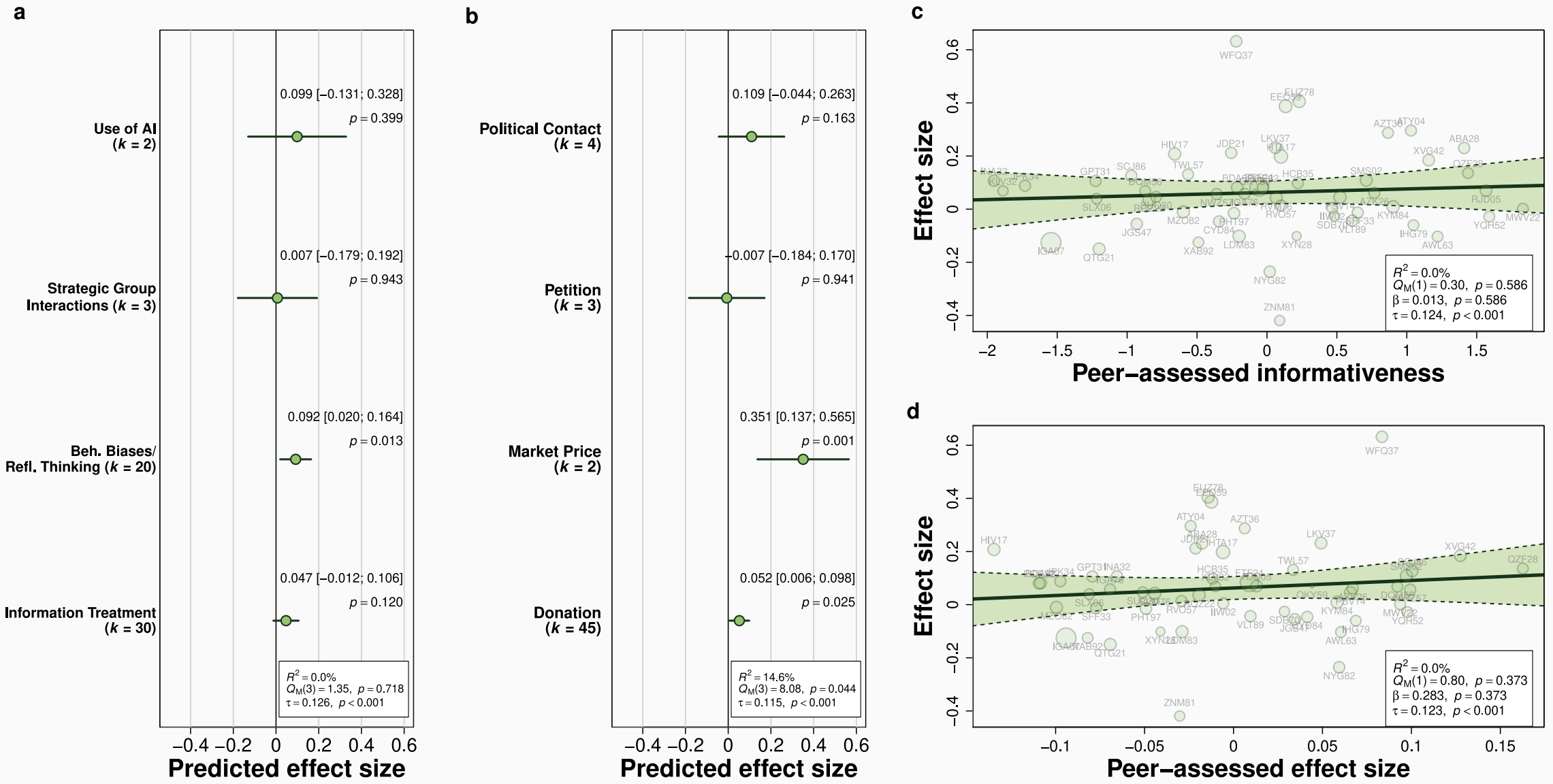
Expected and observed effects on policy support



The average effect is positive and very small



Design features explain little of the variation

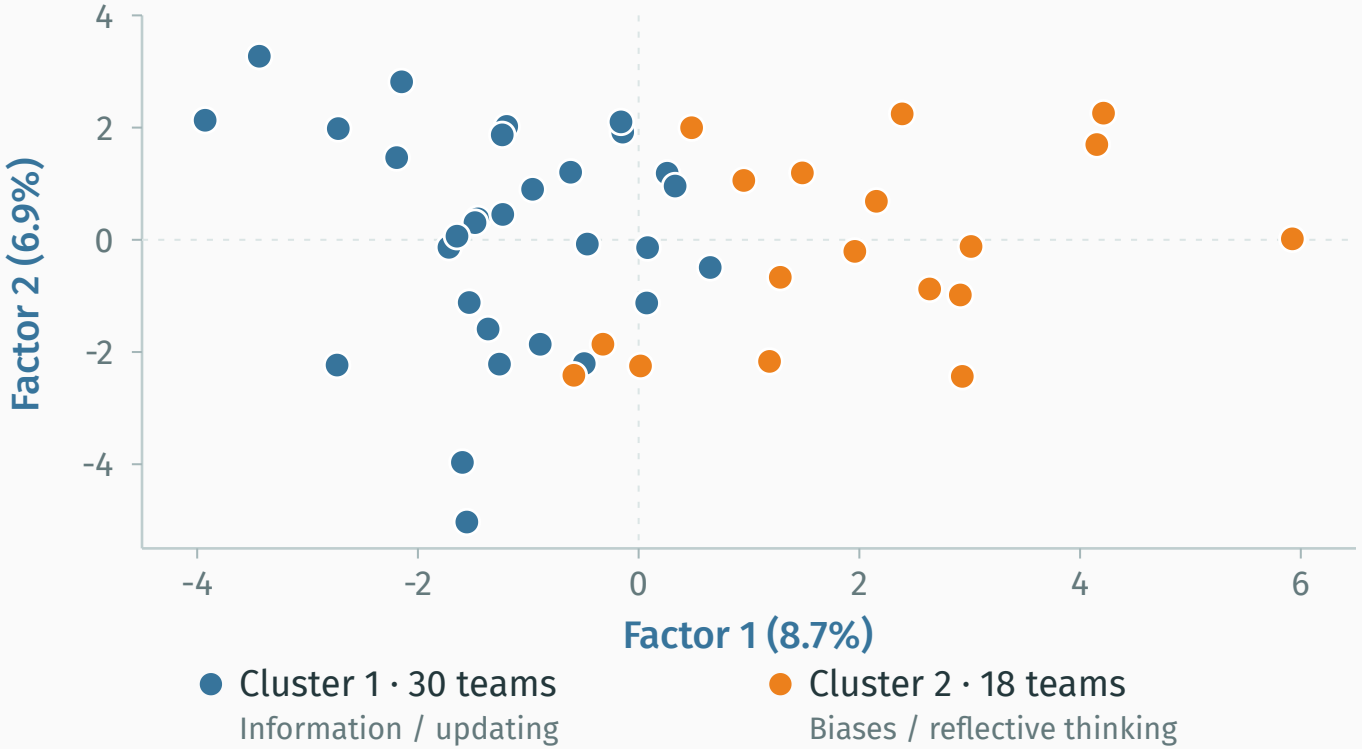


Do broader design profiles explain the effects?

1 SURVEY — 2 CLUSTERS — 3 FACTORS — 4 EFFECTS

48 responding teams

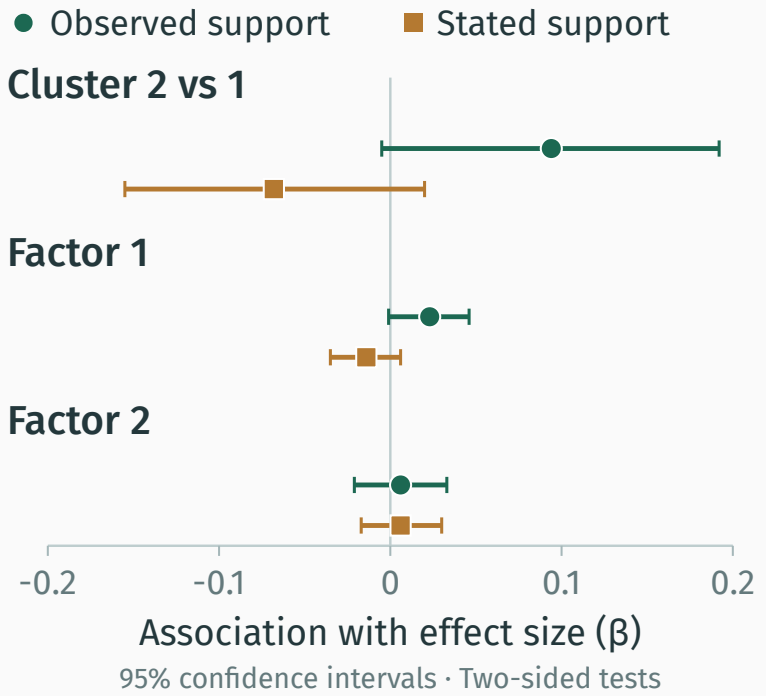
Color: PAM cluster · Position: FAMD scores



● Cluster 1 · 30 teams
Information / updating

● Cluster 2 · 18 teams
Biases / reflective thinking

Are profiles linked to effect sizes?



95% confidence intervals · Two-sided tests

No clear association with observed or stated support effects.

Selective reporting would inflate the estimated effect

ALL 55 DESIGNS

0.063

Pooled observed-support effect

12 SELECTED DESIGNS

0.22

Pooled observed-support effect

Selecting designs with a significant result on at least one primary outcome makes the pooled effect roughly 3.5 times larger.

Cohen's d. Selection: one-sided P < 0.005 on at least one of six primary outcomes. (Benjamin et al., 2018)

Very small effects remain after a conservative exclusion

Does the action reflect a change in policy preferences?

A donation default can change behavior without demonstrating a change in policy preferences.

ALL 55 DESIGNS

0.063

Pooled observed-support effect

95% CI [0.020, 0.106] · P = 0.002

48 DESIGNS · SEVEN EXCLUDED

0.049

After conservative exclusion

95% CI [0.006, 0.092] · P = 0.012

The conclusion of a very small positive effect remains.

Statistical evidence is weaker: suggestive at the preregistered α = 0.005 threshold. (Benjamin et al., 2018)

What we learn from Many Designs

- Behavioral interventions produce a very small positive average effect on support for carbon pricing.
- Multiverse, leave-one-out and GOSH analyses support the conclusion of a very small positive average effect.
- Effects are smaller than researchers expected. For many individual designs, the confidence interval includes both increases and decreases in support.
- Planned follow-up: replicate the most promising interventions with larger samples and greater power to assess whether the initial effects are robust to sampling variation.
- We also plan to test these interventions across countries and cultures to assess whether their effects generalize.

The 55 research teams

The Crowd

55 research teams · 108 co-authors · University of Innsbruck

Anna Lou Abatayo
Magdalena Adamus
Lior Bakalo
Jesus Barreiro-Hurle
Burcak Bas
Piero Basaglia
Oindrila Bhattacharya
Ülkü Bıçakçı
Hayley Blunden
Michelle Blunt
Sandra Bohmann
Pablo Brañas-Garza
Georgia Buckle
Lilith Burgstaller
Romain Cadario
Marina Carmela Orifici
Juana Castro Santa
Fadong Chen
Doron Cohen
Andreas Drichoutis
Christoph Drobner
Moritz Drupp
Elif E. Demiral
Charles Ebert
Laila Elina Nockur
Hande Erkut
Filippos Exadaktylos
Valeria Fanghella
William Fawson
Lars Felder
Kyle Fiore Law
Hanna Fuhrmann-Riebel
Raphael Gottweis
Amélie Gourdon-Kanhukamwe
Manuel Grieder
Sven Gruener
Peter Haan
Hooman Habibnia
Sebastian Hafenbrädl
Emeric Henry
Atar Herziger
Geraldine Holenweger
Christoph Huber
Sebastian J. Goerg
Nicolas Jacquemet
Tao Jin
Fabian Kalleitner
Cankut Kuzlukluoglu
Kanchan Mukherjee
Matthias Kasper
Austėja Kažemekaitytė
Tobias König
Christophe Lembregts
Shuzhen Li
Kristian López Vargas
Wolfgang Luhan
Vincent Mak
Aitor Marcos
Diego Marino Fages
Paul Matthias Gorny
Patrick Maus
Friederike Mengel
Ilana Mermelstein
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Andras Molnar
Laura Moritz
Irene Mussio
Oliver Musshoff
Sarah Necker
Petra Nieken
Marco Palma
Navya Pandit
Tyler Parker-Rollins
Julien Picard
Ori Plonsky
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Giulia Priolo
Julian Quandt
Todd R. Kaplan
Zahra Rahmani Azad
Rastislav Rehák
Andries Richter
Anette Rohmann
Jens Rommel
Yefim Roth
Umit Saglam
Melania Salazar-Ordoñez
Renke Schmacker
Jan Schmitz
Claudia R. Schneider
Michael Schulte-Mecklenbeck
Garima Sharma
Christoph Siemroth
Nisheeth Srivastava
Jakub Šrol
Ivo Steimanis
Stylianos Syropoulos
Iris Vilares
Vivek
Tobias Vorlaufer
Matthew Walker
Francisco Wang
Elke Weidenholzer
Simon Weidenholzer
Yilong Xu
Han Yin
Junhao Vincent Yu
Xian Zhao

02 · AUSTRIAN CARBON PRICING PROJECT

Salient carbon dividends and support for carbon pricing

Rene Schwaiger, Julian Benda, Esther Blanco, Armando Holzknecht, Juergen Huber, Michael Kirchler

OSF project
osf.io/zv4p5

Study 1 preregistration
osf.io/zfvke

Study 2 preregistration
osf.io/bn82w

Can carbon dividends build support?

WHAT SHAPES PUBLIC SUPPORT

- Household costs
- Distributional fairness
- Trust in revenue use

Dechezleprêtre et al. (2025)

REVENUE COLLECTED

Carbon tax



REVENUE RETURNED

Payments to citizens

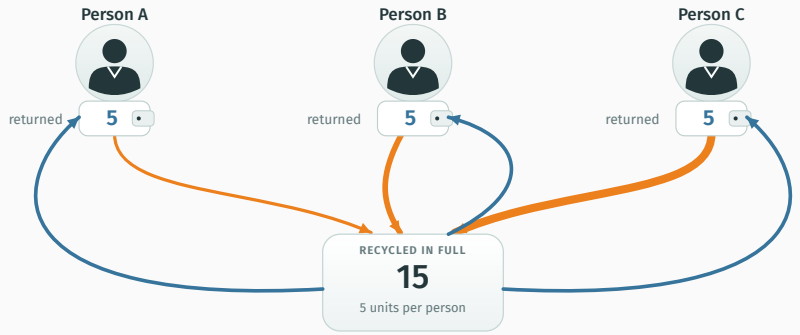
The idea: returning revenue could increase acceptability.

Equal dividends can benefit lower-income households

1 COLLECT — 2 RETURN — 3 NET EFFECT — 4 DISTRIBUTION — 5 EVIDENCE

UNEQUAL CONTRIBUTIONS

Different carbon costs

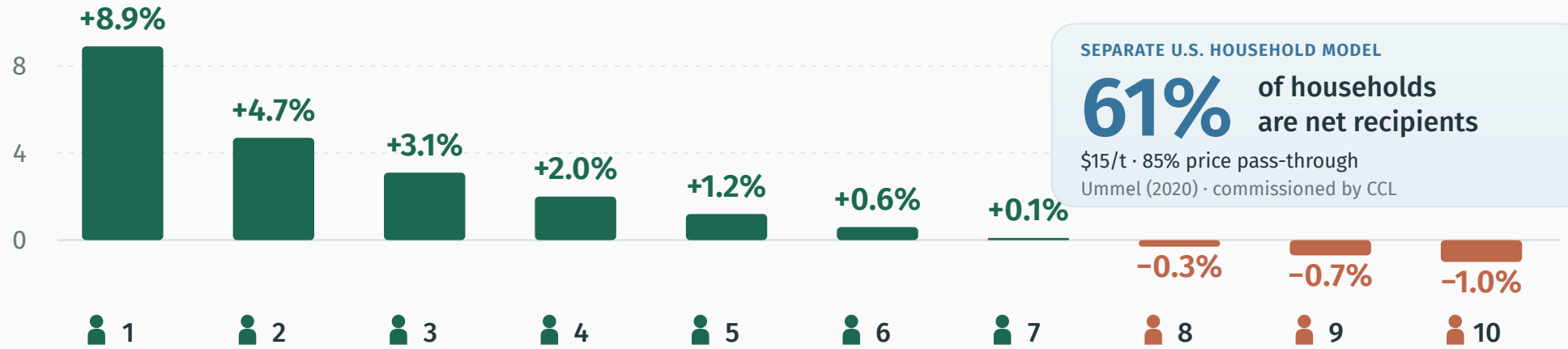


EQUAL RETURN

Same dividend per person

Mean change in after-tax income (%)

U.S. Treasury · simulated distribution



SEPARATE U.S. HOUSEHOLD MODEL

61% of households are net recipients

$15/t · 85% price pass-through

Ummel (2020) · commissioned by CCL

Adjusted family-income decile · lower → higher

Bottom seven income deciles are net recipients on average

U.S. Treasury simulation · $49/t CO_2e · $583 per person per year

Horowitz et al. (2017), Table 6 · home.treasury.gov/system/files/131/WP-115.pdf · Ummel (2020), Figure D1

Evidence from Canada and Switzerland

Canada

Rebates in income-tax returns

REBATE KNOWLEDGE

Rebate amounts were often underestimated.

INFORMATION EXPERIMENT

No detectable increase in policy support.

Switzerland

Deductions from health-insurance premiums

REBATE KNOWLEDGE

Most recipients were unaware of the rebate.

INFORMATION EXPERIMENT

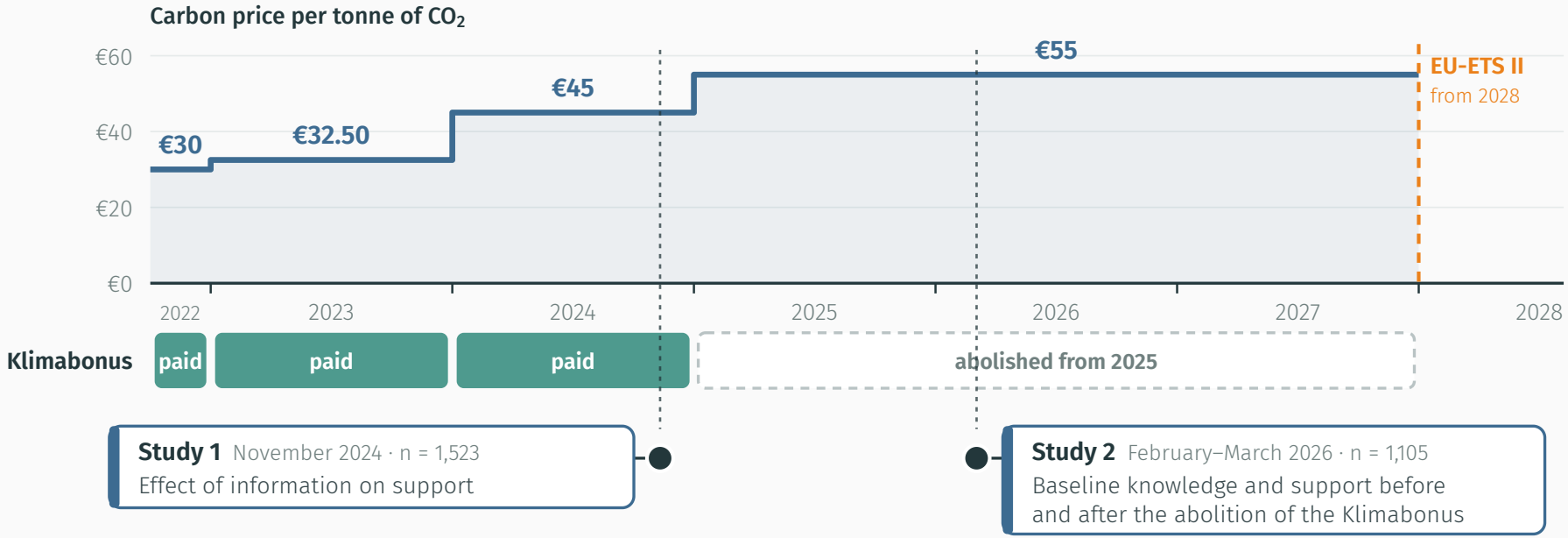
Modest support gain for the existing scheme; no detectable gain for higher rates.

Would a more visible dividend change awareness and support?

Mildenberger et al. (2022) · Nature Climate Change · Programmes at the time of the study

The Austrian Klimabonus

- Introduced alongside Austria's CO_2 pricing reform in October 2022: an annual lump-sum transfer to every eligible resident over three consecutive years (2022–2024).
- Prominently communicated through a nationwide government campaign; paid out automatically to bank accounts or by post as a physical voucher.
- 2024: €145 per adult in well-connected urban municipalities to €290 in the most rural areas; children under 18 received half the adult amount.
- Abolished from 2025 onward, officially attributed to fiscal reasons, while the carbon tax remained in place.



Two preregistered studies

Study 1
November 2024
n = 1,523
Three-arm randomized survey experiment; representative quotas
Panel: Bilendi & Respondi

Baseline
n = 503
Baseline measurement of support, knowledge and perceptions

Tax
n = 511
Information about the carbon tax and how it can reduce emissions

Tax + KB
n = 509
In addition, how the Klimabonus is funded through carbon tax revenues and the associated distributional effects

2025: Klimabonus abolished, carbon tax remains in place

Study 2
February–March 2026
n = 1,105
Cross-sectional follow-up
Panel: Norstat

Study 1 baseline protocol without an information treatment, after the Klimabonus had been abolished; in addition, whether residents are aware that the Klimabonus is no longer being distributed

Both studies were preregistered, and sample sizes were based on power calculations.
Data quality in both studies: attention check before information; screening of unusually short and long completion times.

Two behavioral measures of policy support

- **Donation:** allocate between €0 and €200 of a potential €200 lottery prize to ForTomorrow, an organization that retires allowances from the EU Emissions Trading System.
- **Letter:** sign a letter to the Austrian Federal Ministry advocating an increase in the carbon price to its estimated social cost of €110 per tonne.

Stated support, perceptions and policy knowledge

Stated support and perceptions

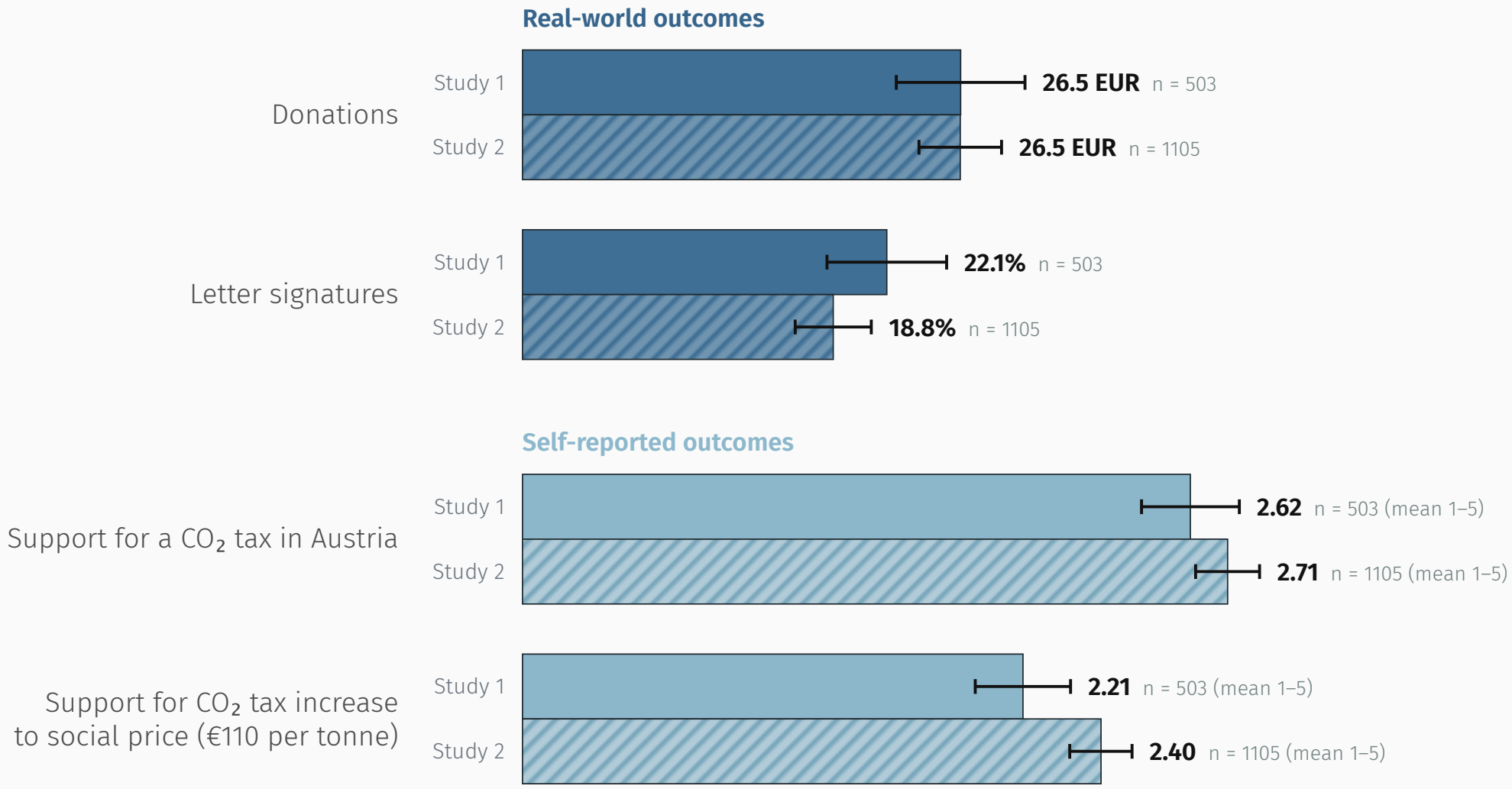
- **Both studies:** support for the carbon tax in place and for a €110-per-tonne price, on five-point scales (1–5). **Study 1** also asked about the planned €45-to-€55 increase.
- **Perceptions:** effectiveness, fairness, burden on low-income households, and the effect on one's own household.

Policy knowledge

- **Study 1:** whether a carbon tax exists, how its revenue is used, and how the Klimabonus is paid (knowledge index, 0 to 3).
- **Study 2:** whether the tax remained in place, whether its revenue now enters the general government budget, and whether respondents expect a Klimabonus in 2026.

> The preregistered two-sided significance threshold is $\alpha = 0.005$. Results with $0.005 \leq P < 0.05$ are suggestive.
> (Benjamin et al., 2018)

Baseline support for the carbon tax



Baseline policy knowledge

Q1
CO_2 tax exists

	Study 1	Study 2
Yes	**72.6%**	**71.4%**
No	**10.5%**	**7.1%**
Don't know	**16.9%**	**21.5%**

Q2
Revenue use

	Study 1	Study 2
Redistributed to people/firms	**13.9%**	**6.1%**
General government budget	**28.5%**	**33.6%**
Renewable energy subsidies	**27.7%**	**25.3%**
Don't know	**29.9%**	**35.0%**

Q3
Expected Klimabonus 2026

	Study 1	Study 2
No	Not measured	**56.9%**
Yes		**5.1%**
Don't know		**38.0%**

Dark outlines: response coded correct. Study 1 baseline n = 503 (Q2: 502). Study 2 n = 1,105.

2026: no new annual entitlement. Outstanding payments for earlier years remain possible.
Independent samples. Differences across studies are descriptive.

Baseline perceptions of the carbon-pricing policy

P1 Effectiveness

	Study 1	Study 2
Strongly disagree	32.4%	26.0%
Rather disagree	22.9%	29.3%
Neither	27.4%	31.6%
Rather agree	15.1%	11.6%
Strongly agree	2.2%	1.5%

P2 Fairness

	Study 1	Study 2
Strongly disagree	35.0%	30.0%
Rather disagree	17.7%	22.1%
Neither	22.7%	24.5%
Rather agree	18.9%	18.7%
Strongly agree	5.8%	4.7%

P3 Burden on low-income households

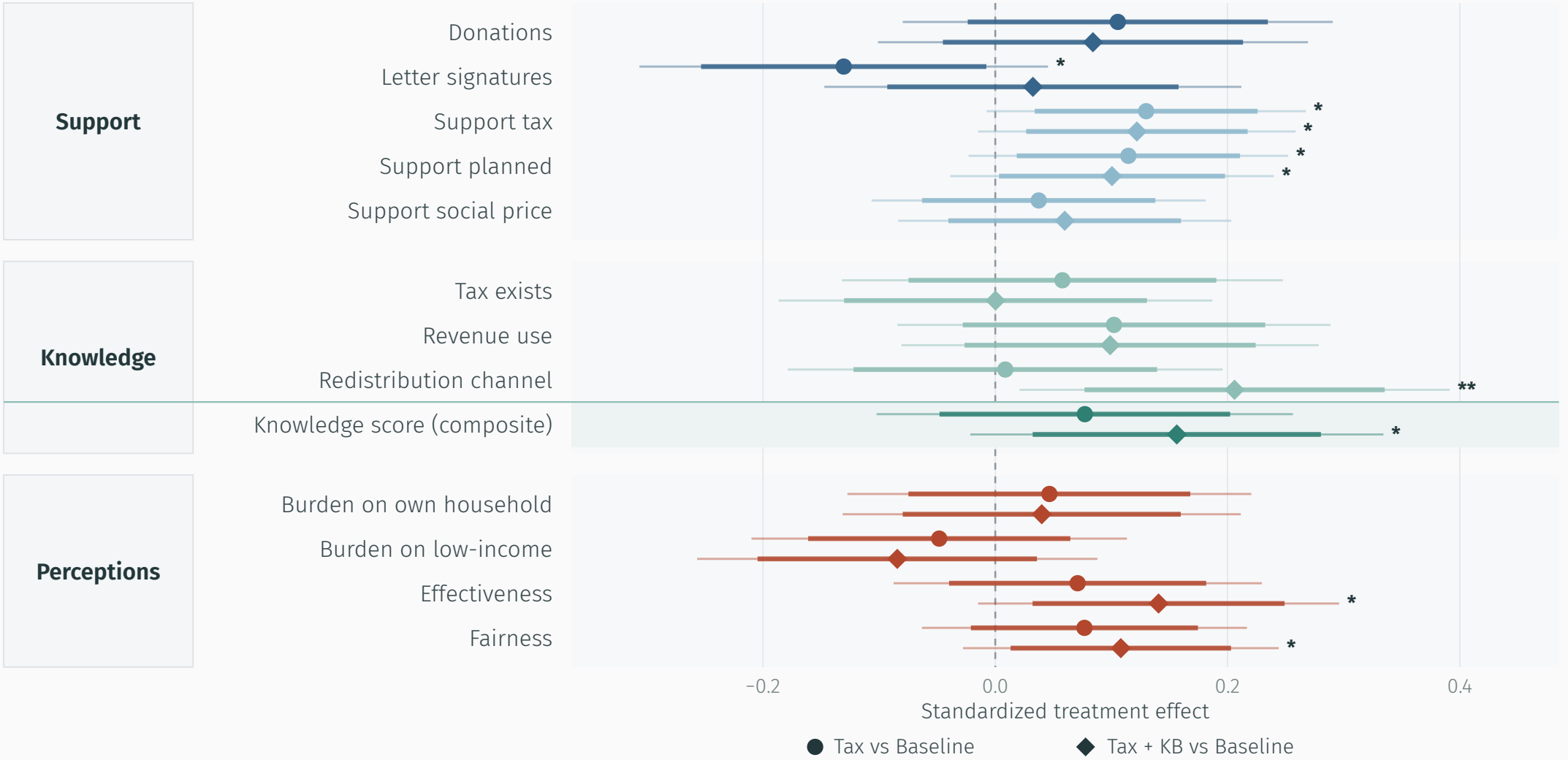
	Study 1	Study 2
Strongly disagree	4.4%	2.4%
Rather disagree	8.3%	6.9%
Neither	18.9%	23.0%
Rather agree	32.2%	32.9%
Strongly agree	36.2%	34.8%

P4 Effect on own household

	Study 1	Study 2
Clearly worse	19.5%	19.1%
Moderately worse	30.2%	28.2%
Neither	44.5%	48.5%
Moderately better	4.2%	3.7%
Clearly better	1.6%	0.5%

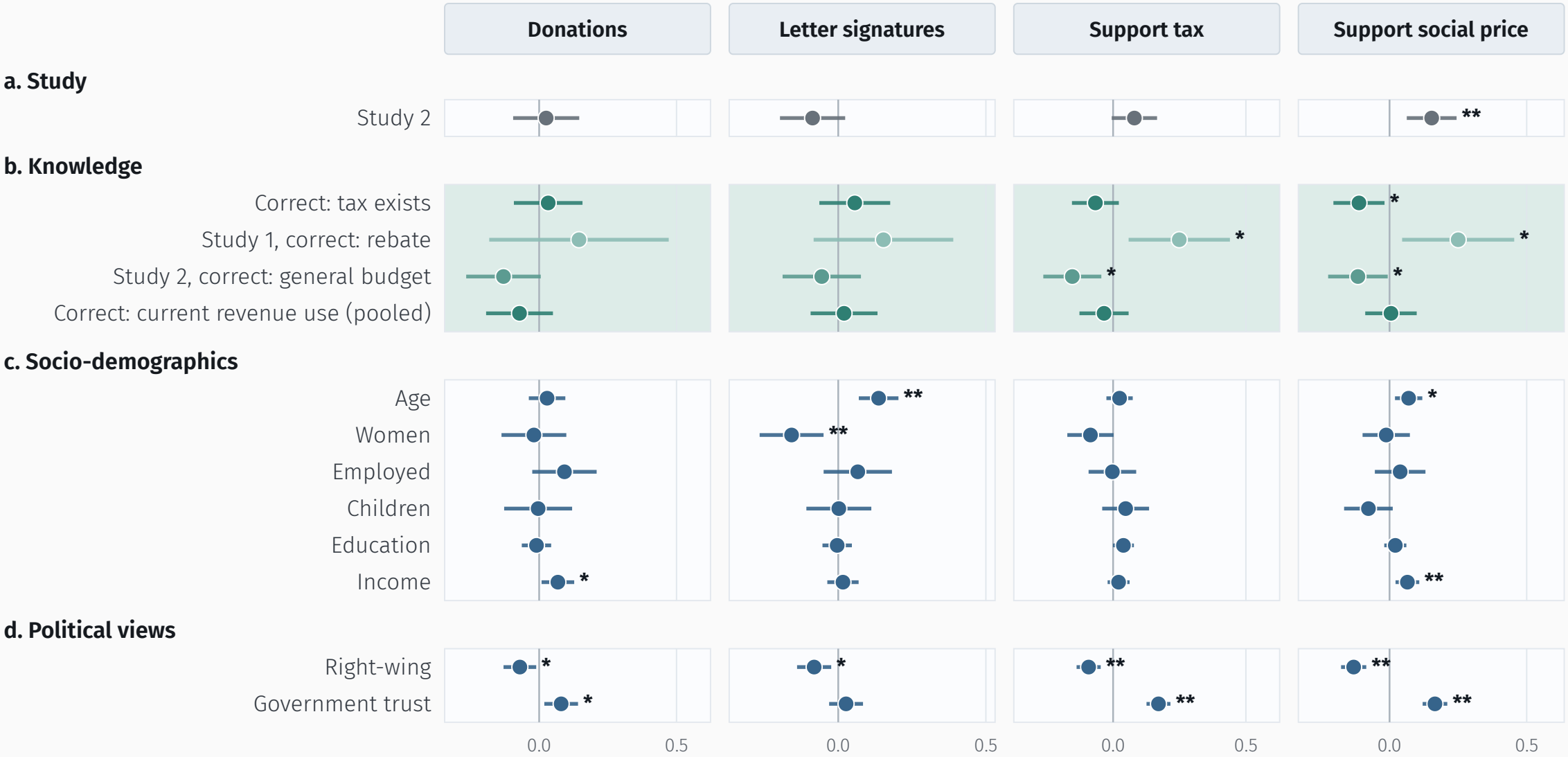
Effects of information on support, knowledge and perceptions

Mediation analysis ↗



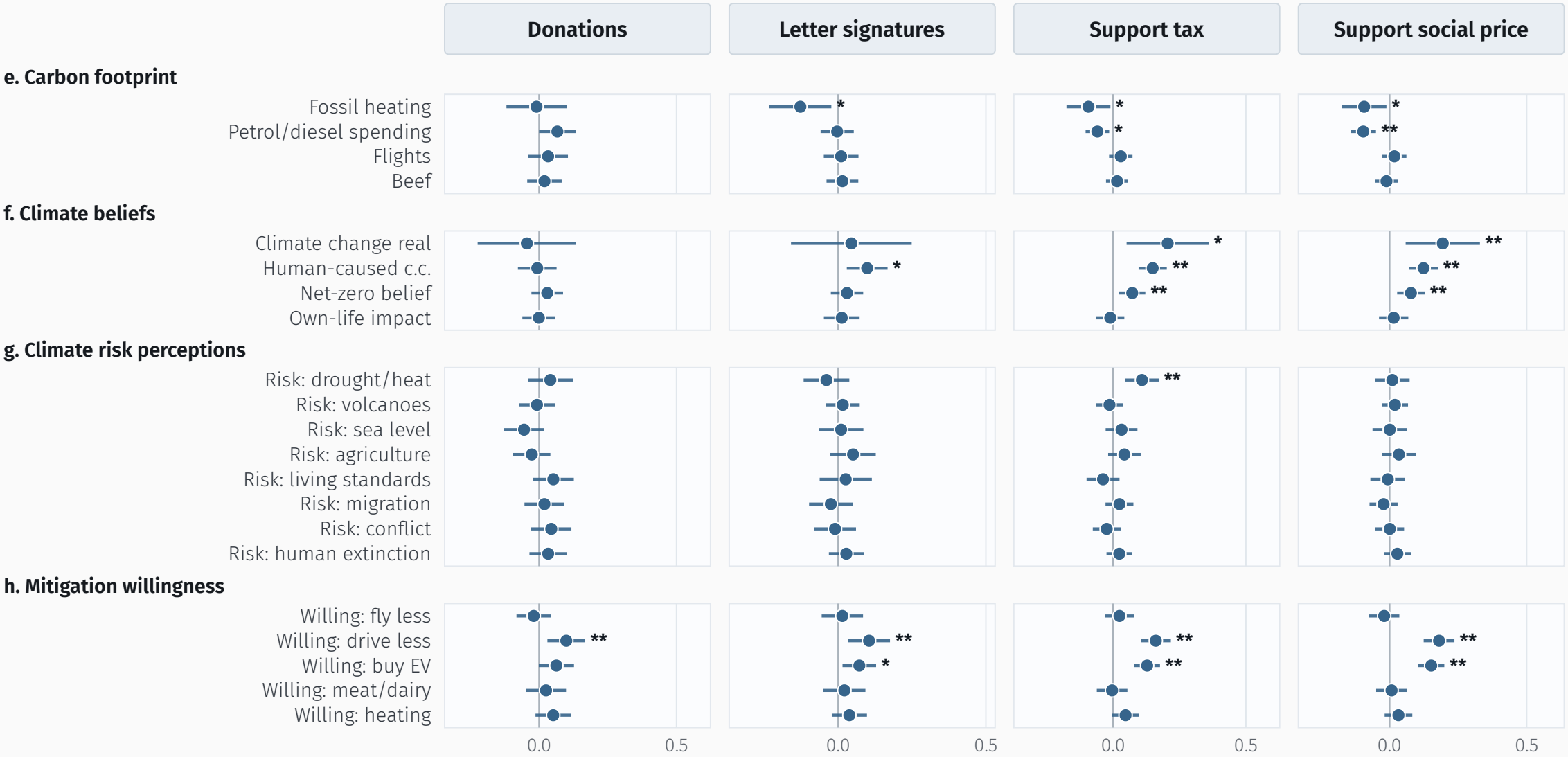
Thick: 95% CI · Thin: 99.5% CI · * 0.005 ≤ P < 0.05 · ** P < 0.005 (two-sided) (Benjamin et al., 2018)

Correlates of support: Study 1 Baseline + Study 2



Standardized associations, adjusted for covariates (95% CI) · * 0.005 ≤ P < 0.05 · ** P < 0.005 (two-sided) (Benjamin et al., 2018)

Correlates of support: Study 1 Baseline + Study 2



Standardized associations, adjusted for covariates (95% CI) · * 0.005 ≤ P < 0.05 · ** P < 0.005 (two-sided) (Benjamin et al., 2018)

What we learn from Austria

- Support was limited in both samples, before and after the dividend's abolition.
- Knowledge of how carbon-tax revenue was used remained limited.
- Neither information treatment changed support at the preregistered $\alpha = 0.005$ threshold.
  (Benjamin et al., 2018)
- Willingness to drive less and political orientation showed more consistent associations with support than policy knowledge.

Two projects, a common empirical pattern

Many Designs

Across 55 designs, behavioral interventions produce very small average shifts in carbon-pricing support.

Austria

Support remains limited in a setting with a visible dividend. Information treatments do not increase support at the preregistered threshold.

(Benjamin et al., 2018)

How can policy design and behavioral interventions build broader support for carbon pricing?

DISCUSSION

What would build durable support for carbon pricing?

Which concerns would a new intervention need to address?

Do consumption choices predict policy support?

Research & contact

rene-schwaiger.online

Papers, projects and contact details

Many Designs results

manydesignscarbon.online/results

Explore the interactive results

Papers and research materials

Many Designs

Holzknecht, **Schwaiger**, Blanco, Huber, Kirchler and collaborators.
Fifty-five crowd-sourced designs assessing carbon pricing support in the U.S.

manydesignscarbon.online · osf.io/ujvdn

Austrian Carbon Pricing Project

Schwaiger, Benda, Blanco, Holzknecht, Huber and Kirchler.
Salient carbon dividends are not enough to generate widespread support for carbon pricing.

Working Paper 2026-08 · updated 5 November 2026

www2.uibk.ac.at/downloads/c9821000/wpaper/2026-08.pdf

Project: osf.io/zv4p5
Study 1: osf.io/zfvke · Study 2: osf.io/bn82w

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State and Trends of Carbon Pricing 2026

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Chapter 13, §13.6.3.3: economic instruments; SPM E.4.2

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Limited impacts of carbon tax rebate programmes on public support for carbon pricing

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Redefine statistical significance · 2, 6–10

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The effectiveness of nudging: A meta-analysis of choice architecture interventions across behavioral domains

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Maier et al. (2022) · PNAS

No evidence for nudging after adjusting for publication bias

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Vlasceanu et al. (2024) · Science Advances

Addressing climate change with behavioral science: A global intervention tournament in 63 countries

doi.org/10.1126/sciadv.adj5778

Horowitz et al. (2017) · U.S. Treasury

Methodology for Analyzing a Carbon Tax · OTA WP 115

home.treasury.gov/system/files/131/WP-115.pdf

Ummel (2020) · Household Impact Study II

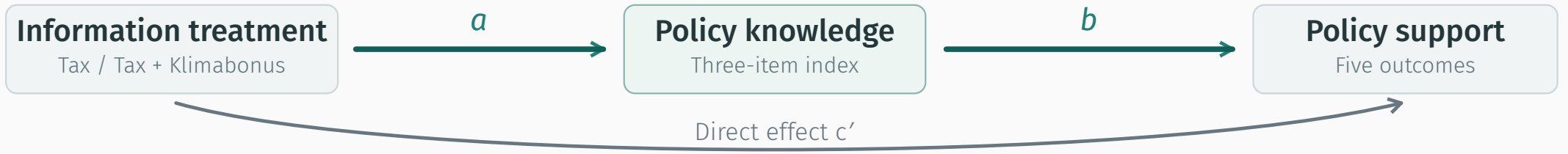
CCL-commissioned working paper · Figure D1

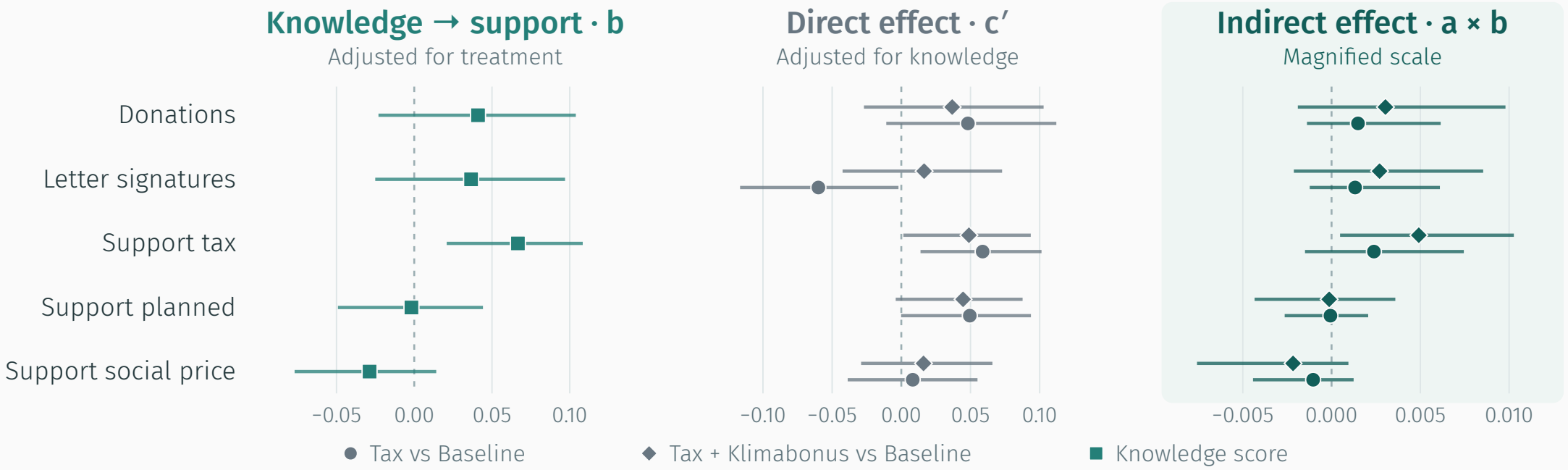
Mediation analysis: policy knowledge and support

← Back to treatment effects

STUDY 1 · EXPLORATORY MEDIATION

Treatment randomized; knowledge not randomized





Completely standardized paths · 95% bootstrap CI · 1,000 resamples · Covariate-adjusted models

No robust evidence of mediation through policy knowledge

Absolute indirect estimates < 0.01 SD; none P < 0.005 (Benjamin et al., 2018).