

Replicability, Transparency, and Crowdscience in Economics

Levent Neyse^{1,2}

¹SOEP at DIW, Berlin, Germany

²WZB, Berlin, Germany

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Outline

① Why Some Results Don't Replicate?

- 2D:4D Literature and Common Heterogeneities
- Conceptual Replications

② What tools do we have?

- Pre-registrations and Pre-analysis Plans
- Registered Reports
- Crowdscience
- Further tools and norms

③ Collaborative efforts and future directions

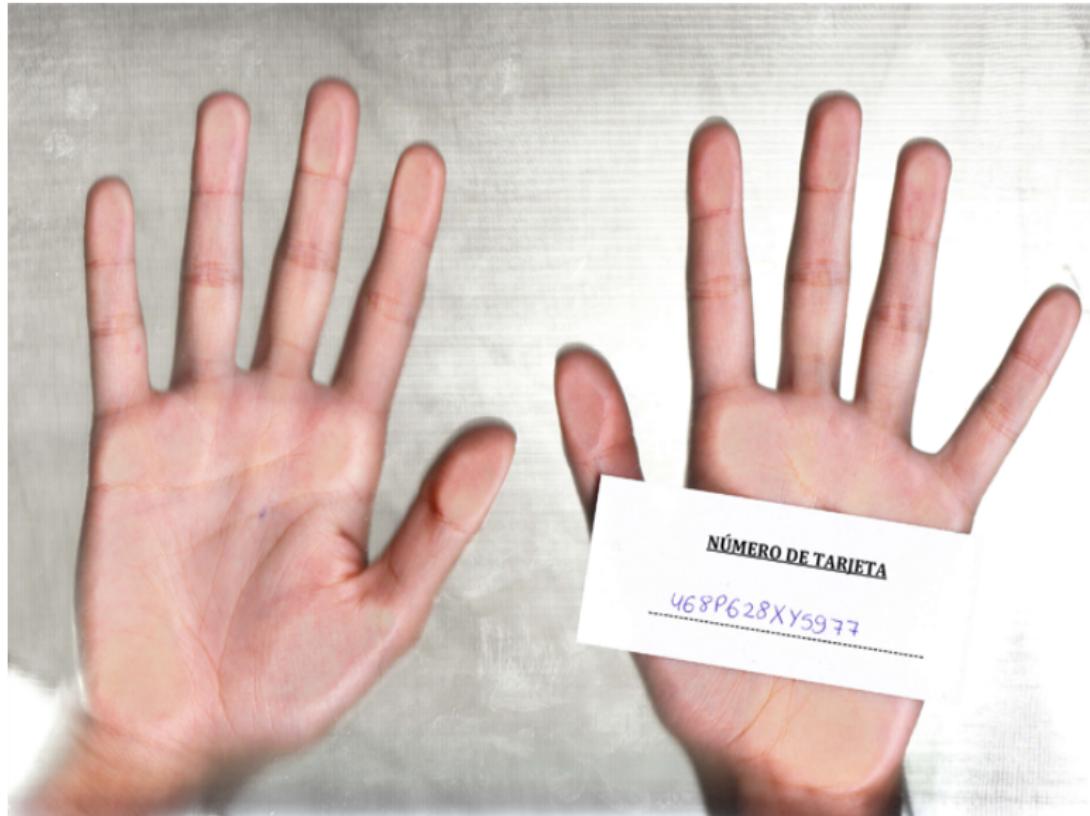
④ Brief results from Open Science Survey

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Why Some Results Don't Replicate?

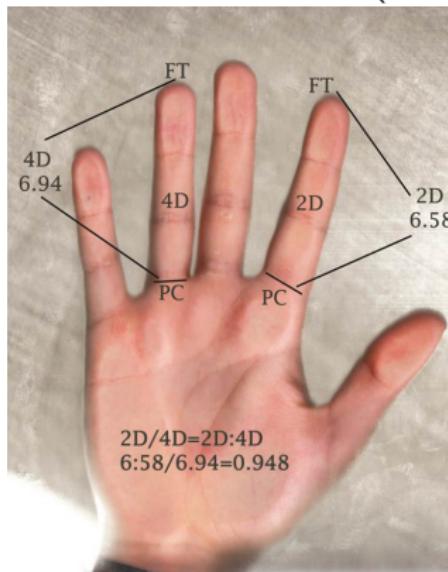
Why Some Results Don't Replicate?

- Publication biases
- Researcher degrees of freedom (not only p-hacking or HARKing but in any steps from design on, e.g., instruction writing, stopping data collection when results get significant)
- Low statistical power
- Multiple comparisons without correction
- Lack of transparency
- Heterogeneities in social sciences



What is 2D:4D (Digit Ratio)?

- It is suggested to be an indirect tool of measuring exposure to prenatal testosterone. (Manning et al., 1998)
- $2D \text{ (Index) } / 4D \text{ (Ring) } = \text{Digit Ratio}$
- Negative correlation between 2D:4D and prenatal testosterone
- Men usually have lower 2D:4D than women. (Manning and Fink, 2018)



Various Results from Economics

- Financial traders with low 2D:4D have higher long-term profitability and remain in the business longer (Coates et al., 2009) (*PNAS*, N= 47)
- Lower DR in women is associated with greater delay discounting (Lucas and Koff, 2010) (*Pers. & Ind. Diff.*, N=184)
- Low 2D:4D is associated with lower loss aversion Hermann (2017) (*Pers. & Ind. Diff.*, N=130)
- No association with 2D:4D and prospect theory. (Neyse et al., 2020) (*Journal of Risk and Uncertainty*, N=285)

and many other studies...

Heterogeneities: Population, design, and analysis

Table 1: Literature on 2D:4D and risk taking

Study	Task	N	Hands	Ethnicities	Result
Brañas-Garza et al. (2018)					
<i>Measure I</i>	EG (\$)	702	Both	Mix	(-)
<i>Measure II</i>	Survey	702	Both	Mix	NS
Lima de Miranda et al. (2018)	EG (\$)	150	Both	Caucasian	NS
Alonso et al. (2018)	HL (\$)	497	Right	Mix	NS
Parslow et al. (2018)	MPL (\$)	330	Both	Mix	NS
Chicaiza-Becerra and Garcia-Molina (2017)	EG (\$)	123	Both	Ladino	NS (R) / (-)(L)
Barel (2017)	Survey	204	Both	Caucasian	NS
Bönte et al. (2016)	Survey	432	Right	Caucasian	NS
Schipper (2012)	HL (\$)	208	Right	Mix	NS
Drichoutis and Nayga (2015)	HL (\$)	157	Right	Caucasian	NS
Aycinena et al. (2014)	HL (\$)	219	Both	Ladino	NS
Stenstrom et al. (2011)	Survey	413	Right	Caucasian	NS (W) / (-)(M)
Garbarino et al. (2011)	MPL (\$)	152	Mean	Caucasian	(-)
Brañas-Garza and Rustichini (2011)	HL	188	Right	Caucasian	(-)
Ronay and Von Hippel (2010)	BART (\$)	52	Mean	Caucasian	(-)(M)
Sapienza et al. (2009)	HL (\$)	183	Mean	Mix	NS
Apicella et al. (2008)	GP (\$)	89	Both	Mix	NS
Dreber and Hoffman (2007)	GP (\$)	152	Both	Caucasian	(-)

Tasks that used monetary incentives are shown with \$. Right hands are shown with R and left with L.

Men are shown with M and women with W. NS represents non-significant results.

(-) and (+) presents the direction of the relationship between 2D:4D and risk-seeking in the tasks.

Task abbreviations are EG: Eckel and Grossman; HL: Holt and Laury; Survey: Self Reported; GP: Gneezy and Potters

Direct and Conceptual Replications

Direct Replication: To what extent results in original studies can be repeated on new data using the same research design and analysis as the original study.

Conceptual replication: To what extent results in original studies can be repeated on new data using an alternative research design and/or analysis to test the same hypothesis.

Conceptual Replication 1: Economic Preferences

"2D:4D does not Predict Economic Preferences: Evidence from a Large, Representative Sample" (with Anna Dreber and Magnus Johannesson) **Journal of Economic Behavior and Organization** (2021)

Methods and Procedures

- 2D:4D measurements in **SOEP-IS** wave 2018. (Both Hands)
- Participants responded a part of the preferences module of Falk et al. (2018). (*QJE*)
- Whole SOEP-IS sample was surveyed. With missing data and participants who did not want to take part the final sample size is around 3400.

Pre-Analysis Plan

We registered the study and the pre-analysis plan in Open Science Framework before the data collection started.

- 5 Main Hypotheses: Risk attitudes, Generosity, +/- Reciprocity, Trust
- Exploratory Analyses, Robustness Tests and Statistical Approaches
- Main body and Appendix content

Result

- No meaningful relationship between 2D:4D and economic preferences was observed.

Conceptual Replication 2: CRT & Self-Employment

Entrepreneurship, Management and Cognitive Reflection:
A Pre-registered Replication Study with Extensions

Frank, M. Fossen and Levent Neyse

Published at **Entrepreneurship Theory and Practice** (2023)

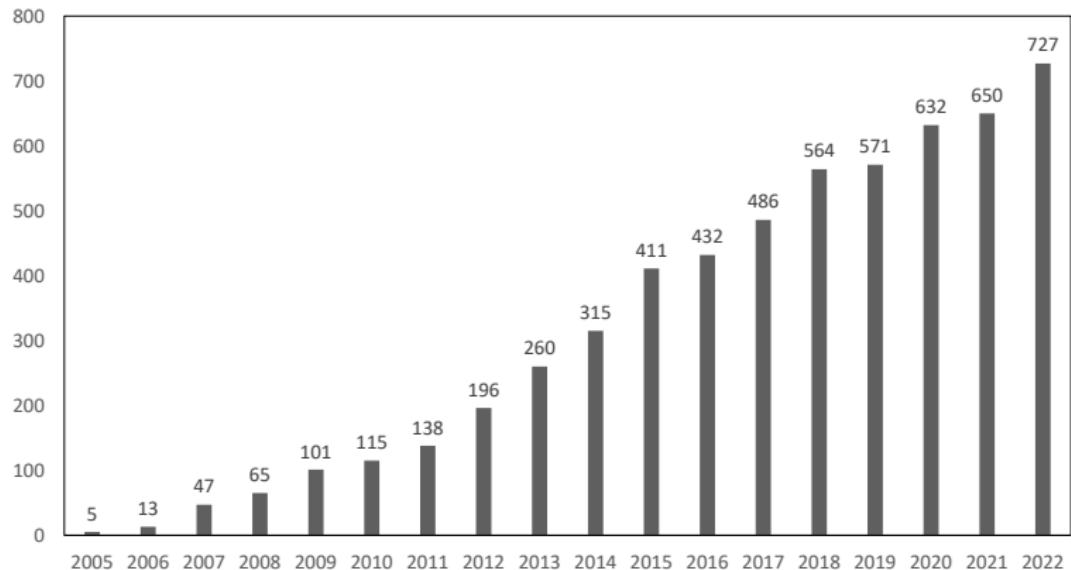
CRT: Questions (Frederick, 2005)

- ① A bat and a ball cost \$1.10 in total. The bat costs \$1.00 more than the ball.
How much does the ball cost?
(intuitive answer 10, correct answer 5)

- ② If it takes 5 machines 5 minutes to make 5 widgets, how long would it take
100 machines to make 100 widgets?
(intuitive answer 100, correct answer 5)

- ③ In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If
it takes 48 days for the patch to cover the entire lake, how long would it take
for the patch to cover half of the lake?
(intuitive answer 24, correct answer 47)

CRT: Citations over time Frederick (2005)



Motivation

Koudstaal et al. (2019) show that entrepreneurs make more intuitive decisions than hired managers but equally intuitive decisions with employees (Small Business Economics)

- We use CRT instead of Contemplative Index (CI) (Rubinstein, 2016) to measure intuitive decision-making style. (They did not use CRT due to previous knowledge and the study was online)
- We extend the analysis with overconfidence measures (guesses in the module), Big-5 Personality traits, parental occupation, employer vs nonemployer entrepreneurs.

Methods

- Same statistical approach as Koudstaal et al. (2019)
- N=1961 (183 entrepreneurs, 334 hired managers, 1444 non-manager employees)
- Pre-registered as before and added extensions
- Final PAP sent to original authors before access to the data

▶ Previous knowledge

Results

- Our results confirm the results of Koudstaal et al. (2019): Entrepreneurs do not resist intuitive decisions as much as hired managers do.
- The difference is not fully explained by self-selection into occupations, but partially by overconfidence.

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What tools do we have?

Pre-analysis Plans (PAPs)

A publicly documented, time-stamped plan summarizing a study's design and hypotheses before the data are collected (e.g., for first-hand data such as experimental) or getting access to the final dataset (e.g., panel studies). It establishes an unalterable record, promoting transparency in research by allowing others to evaluate a study's final report in light of the intended research plan.

PAPs include

- RQs and hypotheses: Clearly defined
- Sample: Selection, power calculation, population...
- Sequencing of analyses: primary vs. secondary tests, including subgroup analyses, heterogeneity, and robustness checks
- Design Details: data cleaning, outliers...
- Data resources and variables: Data collection methods, stopping rules, variable construction
- Statistical Approach and outcomes: Significance threshold
- Timeline and Milestones
- Pilot and existing data
- Ethics: Consent, data governance...
- Statistical Methods: Statistical models, methods, estimators, control variables

Pre-registration platforms

- Open Science Framework (OSF)
 - AsPredicted
 - ClinicalTrials.gov
 - AEA Registry
-
- RIDIE (Registry for International Development Impact Evaluations)
 - Prospero

Registered Reports

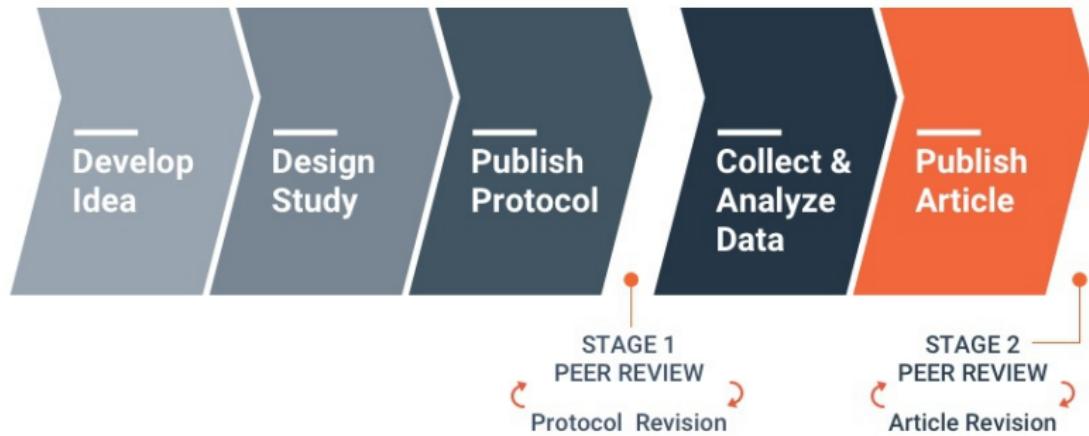


Figure credit think.f1000research.com

About 15 Journals accept Registered Reports

- Journal of Political Economy: Microeconomics
- Nature Journals
- Entrepreneurship Theory and Practice
- Review of Finance
- Journal of Development Economics
- European Economic Review (replication studies only)
- ESA
- Journal of Behavioral and Experimental Economics

Check LabSquare.net for the whole list and updates

Crowd Science

- Many Labs: Coordinated data collection in multiple labs. Can tackle limited sample sizes and population heterogeneity.

Example: Camerer et al. (2016) Science; on-going: ML-DACH

- Many Designs: Single research question, multiple designs, a single meta-analysis paper. Can tackle design heterogeneity

Example: Huber et al. (2023) PNAS

- Many Analysts: Single dataset, many analysts. Can tackle analysis heterogeneity.

Example: Menkveld et al. (2024) Journal of Finance;
On-going: ManyDaughters

Further Tools and Norms

- Transparency at all steps of research
- Tools of Open-Science: Data, code, software,
- Coordination and communication among all stakeholders
- More registered reports, less biased evaluation process
- Less quantity, more quality
- Incentives: New evaluation criteria for new types of research
- More replications and meta-science
- Systematic communication with all stakeholders
- Decreasing inequalities and increasing diversity
- Understanding researchers and their incentives

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Collaborative efforts and future directions





Project Team



Levent Neyse
WZB & DIW



David Albrecht
WZB



Aurélien Baillon
Emlyon Business School



Séverine Toussaert
University of Oxford



Magnus Johannesson
Stockholm School
of Economics



Felix Holzmeister
Innsbruck University



Anna Dreber
Stockholm School
of Economics



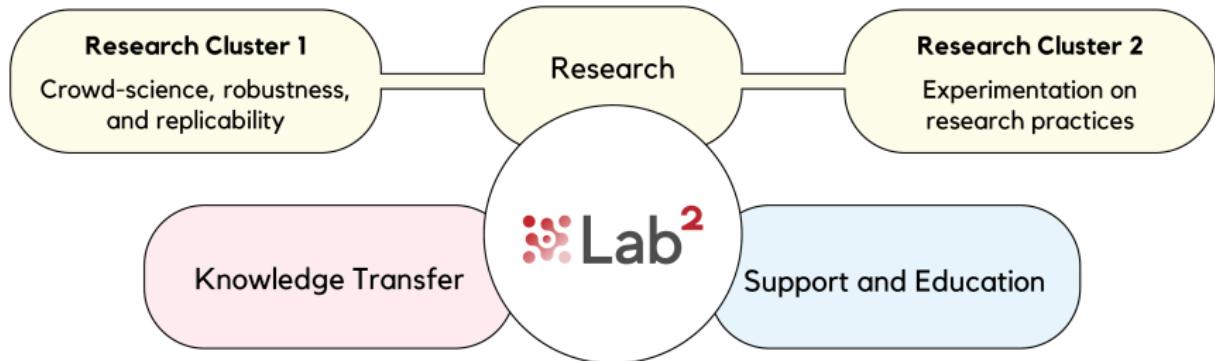
Taisuke Imai
Osaka University

Network



New and upcoming partners Leibniz Association, Gesis, RWI Essen, KIT, LSE, Maastricht Uni., SOEP, BSE-Barcelona, Southampton Uni, and more.

Work Program



Research Program

- Research Cluster 1: Crowd-science, robustness, and replicability:
 - Many-labs
 - Many-designs
 - Many-analysts
 - Many-panels
 - Meta-analyses
 - Direct and conceptual replications
- Research Cluster 2: Experimentation on research practices
 - Activity reports from member labs (e.g., PAPs, number of pilots per study, methods, etc.)
 - Attitudes about PAPs and pre-registration

Short and Mid-Term Prospects

- **Systematize organizing large-scale studies** involving many researchers and labs in a cost-efficient and democratic manner (e.g. choice of topics; decentralizing organization).
- Research with non-behavioral economists (e.g. Applied Micro, Labor) and expand the research and the network to **other disciplines** such as psychology, sociology, and political sciences.
- Expanding our network in the **global south and developing countries**. Already established connections (e.g. Liseli Lab: Zambia, Mission Lab: Philippines, Uruguay, Colombia, Salvador, Dominican Republic, Vietnam...)



www.labsquare.net

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Brief results from VfS Open Science Survey

Stats

Count	Field				Grand Total
	Business Administration	Economics	Other		
Doctoral Researcher (PhD Student)		32	3	35	
Junior Professor		11		11	
Other:	1	20		21	
Post-doctoral Scholar	1	56	6	63	
Prefer not to say	1	2		3	
Private Lecturer (Privatdozent:in)		8		8	
Professor	14	159	8	181	
Grand Total	17	288	17	322	

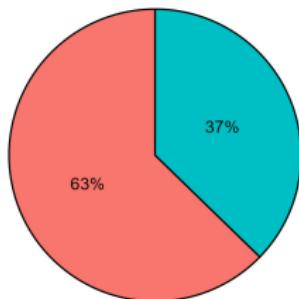
Gender	Count
Female	83
Male	224
Non-binary / third gender	1
Prefer not to say	14
Grand Total	322

Count	Attend Meeting			
	VFS Member	No	Yes	Grand Total
No		19	2	21
Yes		216	85	301
Grand Total		235	87	322

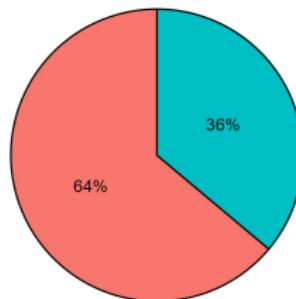
Preregistration practices

Have you preregistered one or several of your research projects?

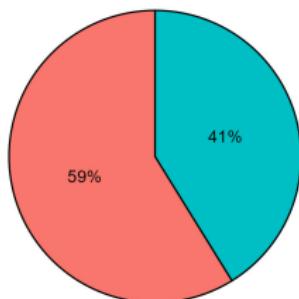
All (n=322)



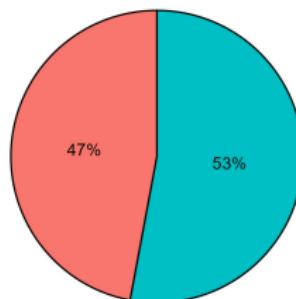
Economics (n=288)



Business Administration (n=17)



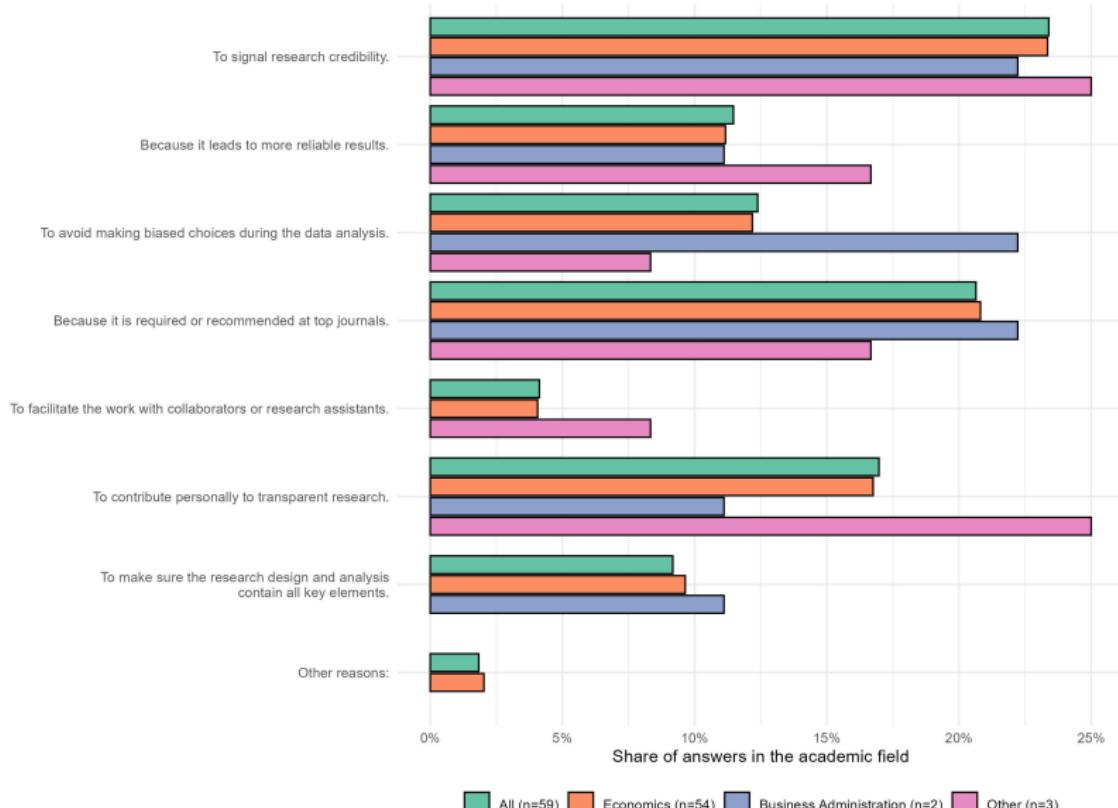
Other (n=17)



■ No ■ Yes

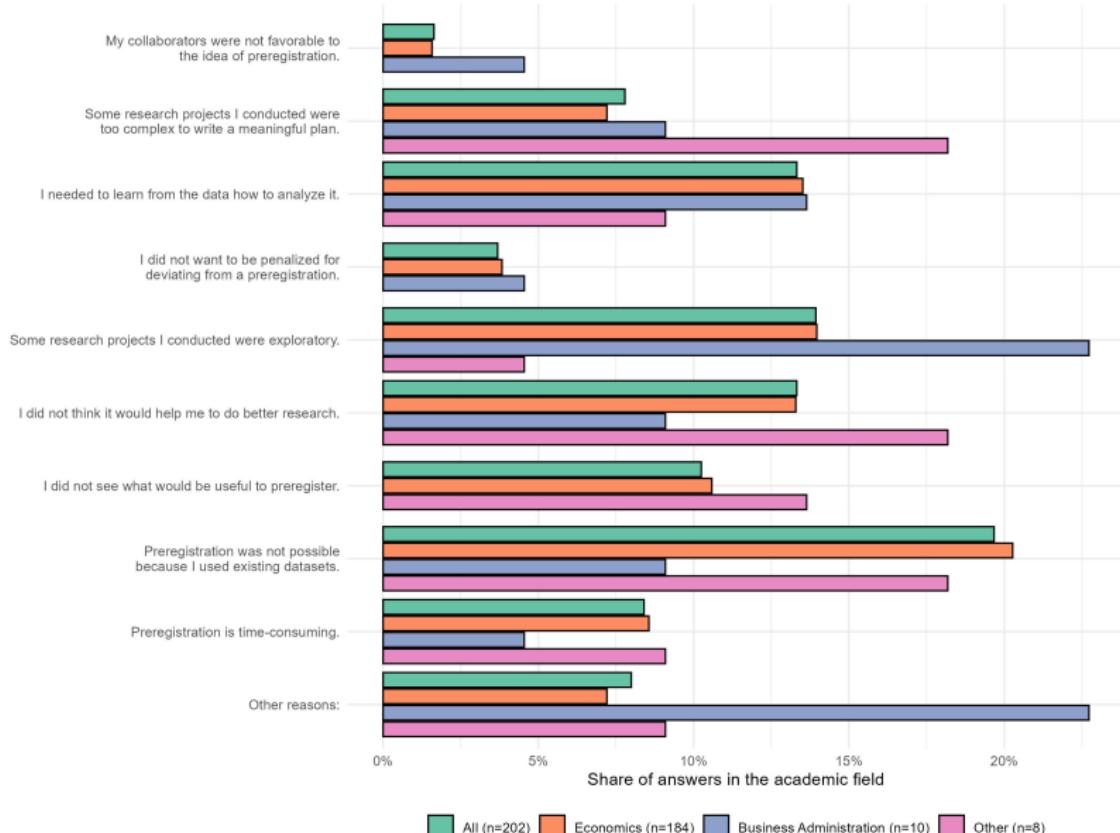
Why preregister?

What were the main reasons that brought you (or your collaborators) to preregister your research projects?



Why not preregister?

Why did you not preregister your research?



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Previous knowledge

Table 2: Correct answers and reported task knowledge

CRT-correct	Yes	No	Do not know
0	5	804	2
1	20	592	1
2	47	439	3
3	71	252	2

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