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The causal effect of religious and environmental identity on green preferences: A combined priming and stated choice experiment

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1. Background

Social identity

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- Social identities are tied to identity-specific norms that prescribe how people should behave in particular situations
- Introduced to economics in 2000 (Akerlof and Kranton, 2000; Bénabou and Tirole, 2006)
- Acting against the norms related to social identity might cause psychological cost and thus result in a loss in utility

Religious and environmental identity

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- Environmental identity
  - Effects on diverse green activities, e.g. participation in green electricity programs (e.g. Kotchen and Moore, 2007), probability to live in solar homes (e.g. Dastrup et al., 2012), adoption of energy saving measures (e.g. Fischbacher et al., 2015), carbon offsetting (e.g. Schwirplies and Ziegler, 2016)
- Religious identity:
  - Effects on general behavior e.g. savings (e.g. Guiso et al., 2003), risk preferences (e.g. Barsky et al., 1997, Shu et al., 2012), hours worked (e.g. Spenkuch, 2017), trust (e.g. Chuah et al., 2016)
  - However: Effects on green behavior are ambiguous (e.g. Owen and Videras, 2007; Martin and Bateman, 2014; Cui et al., 2015)

Causality?

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- Unobserved factors correlated with both environmental values and green preferences, e.g. childhood home environment, general socialization? (e.g. Shariff and Norenzayan, 2007, Benjamin et al., 2016)
- Direction of effects (e.g. development of green identity after experiences with green behavior or vice versa)? (e.g. Videras et al., 2012)

Priming technique

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- Technique from experimental psychology
- Raises saliency of specific identity (at least temporarily) by activating mental concepts through subtle situational cues e.g. tasks, questions, pictures (e.g. Cohn et al., 2017)
- Identification of causal (marginal) effect of primed concepts without confounding influence of other unobserved factors

Priming technique

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Research question

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Is there a causal effect of religious or environmental identity on green behavior (choice of electricity tariffs)?

2. Experimental setting

Survey and questionnaire

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- Project “Energio” funded by the BMBF
- June and July 2016 (Psyma Group)
- Online panel
- Stratified sample (and subsamples): Age, gender, place of residence, and religious affiliation
- 3705 German adults, who are responsible for electricity bills and choice of electricity providers and contracts

Survey and questionnaire

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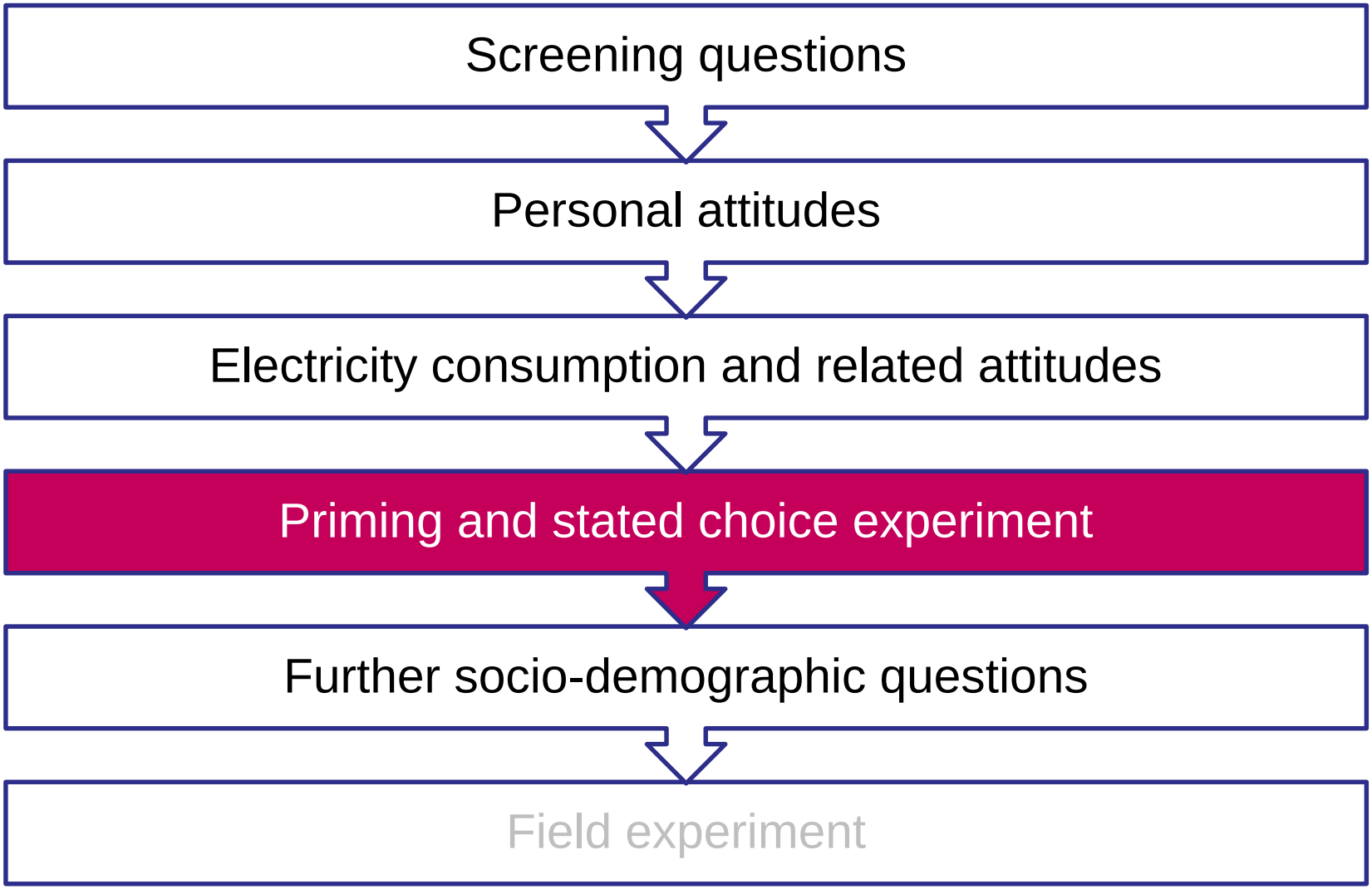

Priming and stated choice experiment

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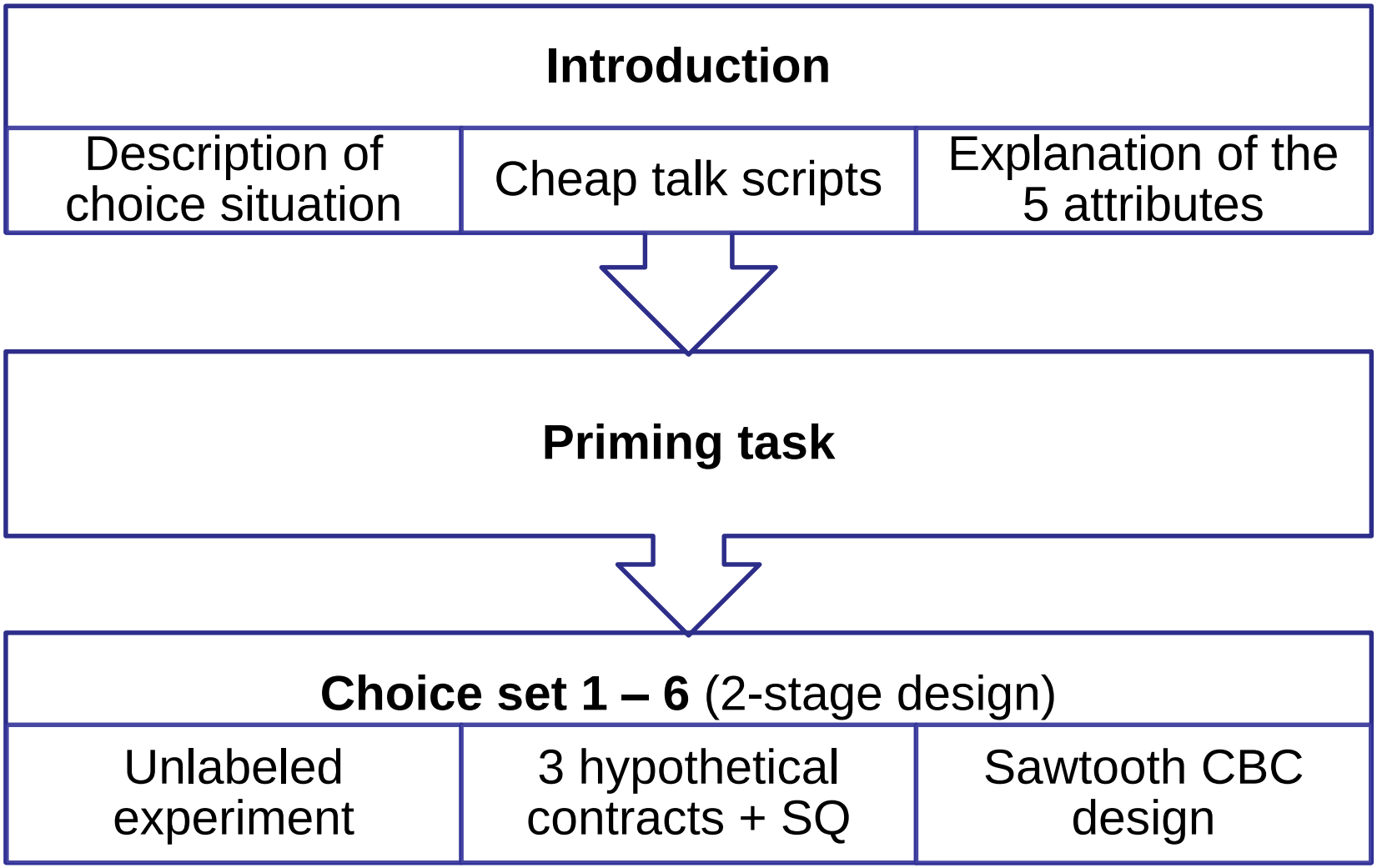

Attributes

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Attributes	Attribute levels
Electricity mix of the chosen tariff	• 100% renewable energies from a green provider • 100% renewable energies from a conventional provider • Mix of renewable energies and fossil energy sources • Mix of renewable energies, fossil, and nuclear energy • Mix of fossil energy sources and nuclear energy
Type of the electricity provider	• Energy cooperative (“Energiegenossenschaften”) • Municipal or regional utility • Supra-regional German electricity provider • Foreign electricity supplier
Location of the electricity provider	• Within the own region • Outside the own region
Guaranteed share of regionally produced electricity	0%, 25%, 50%, 75%, 100%
Annual electricity cost	-30%; -20%; -10%, 0%; 10%; 20%, 30% (compared to last year’s electricity cost, stated mean annual electricity cost: 773.83 Euro)

Priming treatment groups

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Religious priming

"Before we start the survey, please describe some positive aspects of religion and faith (e.g. in terms of community, safety, afterlife, spirituality)"

"solidarity", "community", "hope", …

!also negative aspects listed!

Environmental priming

"Before we start the survey, please describe some positive aspects of (private) environmental protection (e.g. in terms of conservation of livelihood of humans, animals and plants,…)"

"fresh air", "biodiversity", "waste separation", …

Control group

No priming task

Choice set

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Please take a look at the three following contracts. Please choose the one you would conclude most likely.

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	Contract 1	Contract 2	Contract 3
Location of the electr. provider	Within the own region	Outside the own region	Within the own region
Electricity mix of the chosen tariff	100% renewable energies (provider sells electricity from renewable energies as well as from fossil energy sources)	100% renewable energies (provider sells only electricity from renewable energies)	Mix of renewable energies, fossil energy sources and nuclear energy
Guaranteed share of regionally prod. electricity	100%	0%	50%
Annual electricity cost	792 € / year	504 € / year	848 € / year
Type of electr. provider	Supra-regional German provider	Foreign provider	Municipal utility
	○	○	○

Region / energy cooperative / annual electricity cost in Euro / electricity tariff with 100% renewable energy

Would you prefer to stay with your actual contract instead of choosing one of the previously presentet electricity tariffs?

- ○ yes
- ○ no

Status quo alternative

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- Status quo: current contract of individual respondent
- Internet research on type of provider, electricity mix, etc. (83 missing, 1,975 full information)
  - Minor corrections e.g. switch name of provider and tariff, impute tariff if only one tariff offered (157 cases)
  - Stronger assumptions:
    - Basic supply tariff or most often sold tariff of the stated provider, if unspecific name for tariff (1,358 cases)
    - Regional municipal utility, if unspecific name for municipal utility (132 cases)
- Distance to provider based on GIS data (ZIP codes)

Status quo alternative

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Attribute levels: Electricity mix	Share of respondents
100% renewable energies from a green provider	17.09%
100% renewable energies from a conventional provider	11.52%
Mix of renewable energies and fossil energy sources	3.83%
Mix of renewable energies, fossil energy sources, and nuclear energy	65.21%
Mix of fossil energy sources and nuclear energy	0.05%

3. Econometric analysis and estimation results

Econometric approach

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- Mixed logit models
- Dependent variable: Choice between three hypothetical electricity contracts and current contract
- Estimations in willingness to pay space (qualitatively similar results in preference space)
- Fixed parameters: annual electricity costs (in preference space estimations), status quo, interactions with treatment variables
- Random parameters: annual electricity costs (in willingness to pay space estimations), attribute levels

Preliminary results

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Explanatory variables	Parameter estimates (robust z-statistics)			
	Attribute levels		Env. Prime	Rel. Prime
	Mean	Standard deviation	Mean	Mean
100% renewable energies form a green provider	**0.22*** (12.65)	**0.15*** (12.90)	**0.06** (2.04)	-0.01 (-0.42)
100% renewable energies from a conventional provider	**0.14*** (9.21)	**0.10*** (7.15)	0.03 (1.04)	-0.03 (-1.27)
Mix of renewable energies and fossil energy sources	**0.10*** (6.35)	**0.10*** (6.39)	0.05 (1.61)	-0.01 (-0.37)
Mix of renewable energies, fossil energy sources, and nuclear energy	**0.05*** (3.09)	**0.15*** (14.00)	0.02 (0.75)	-0.01 (-0.38)
Other Attributes	YES	YES	NO	NO
Status quo (current contract)	**0.22*** (24.02)	--	--	--
Number of units (observations)	1722 (10332)			

Preliminary results

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Explanatory variables	Parameter estimates (robust z-statistics)			
	Attribute levels		Env. Prime	Rel. Prime
	Mean	Standard deviation	Mean	Mean
100% renewable energies form a green provider	**0.10*** ** (2.91)	**0.12*** ** (5.93)	0.02 (0.50)	-0.00 (-0.04)
100% renewable energies from a conventional provider	**0.10*** ** (3.22)	**0.12*** ** (3.99)	0.02 (0.40)	-0.03 (-0.75)
Mix of renewable energies and fossil energy sources	**0.05*** (1.75)	0.03 (1.45)	0.07 (1.49)	-0.00 (-0.05)
Mix of renewable energies, fossil energy sources, and nuclear energy	0.04 (1.32)	**0.16*** ** (7.55)	0.03 (-0.49)	-0.00 (-0.14)
Other Attributes	YES	YES	NO	NO
Status quo (current contract)	**0.22*** ** (11.69)	--	--	--
Number of units (observations)	634 (3804)			

Only participants with low environmental values (measured in NEP scale)

Preliminary results: Env. priming

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Explanatory variables	Parameter estimates (robust z-statistics)			
	Attribute levels		Env. Prime	
	Mean	Standard deviation	Mean	
100% renewable energies form a green provider	**0.27***** (11.94)	**0.18***** (14.77)	**0.09**** (2.18)	
100% renewable energies from a conventional provider	**0.17***** (8.21)	**0.12***** (4.53)	0.04 (0.91)	
Mix of renewable energies and fossil energy sources	**0.13***** (6.68)	**0.09***** (4.41)	0.07 (1.54)	
Mix of renewable energies, fossil energy sources, and nuclear energy	**0.05***** (2.30)	**0.16***** (9.25)	0.06 (1.47)	
Other Attributes	YES	YES	NO	
Status quo (current contract)	**0.23***** (16.61)	--	--	
Number of units (observations)	640 (3840)			

Only participants with high environmental values (measured in NEP scale)

Preliminary results: Rel. priming

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Explanatory variables	Parameter estimates (robust z-statistics)			
	Attribute levels			Rel. prime
	Mean	Standard deviation		Mean
100% renewable energies form a green provider	**0.26*** ** (12.98)	**0.17*** ** (15.83)		-0.02 (-0.73)
100% renewable energies from a conventional provider	**0.16*** ** (9.65)	**0.12*** ** (9.91)		-0.03 (-1.30)
Mix of renewable energies and fossil energy sources	**0.12*** ** (5.75)	**0.09*** ** (4.85)		-0.01 (-0.33)
Mix of renewable energies, fossil energy sources, and nuclear energy	**0.05*** ** (2.72)	**0.16*** ** (13.62)		-0.00 (-0.14)
Other Attributes	YES	YES		NO
Status quo (current contract)	**0.23*** ** (21.18)	--		--
Number of units (observations)	882 (5292)			

Only participants with high environmental values (measured in NEP scale)

Preliminary results

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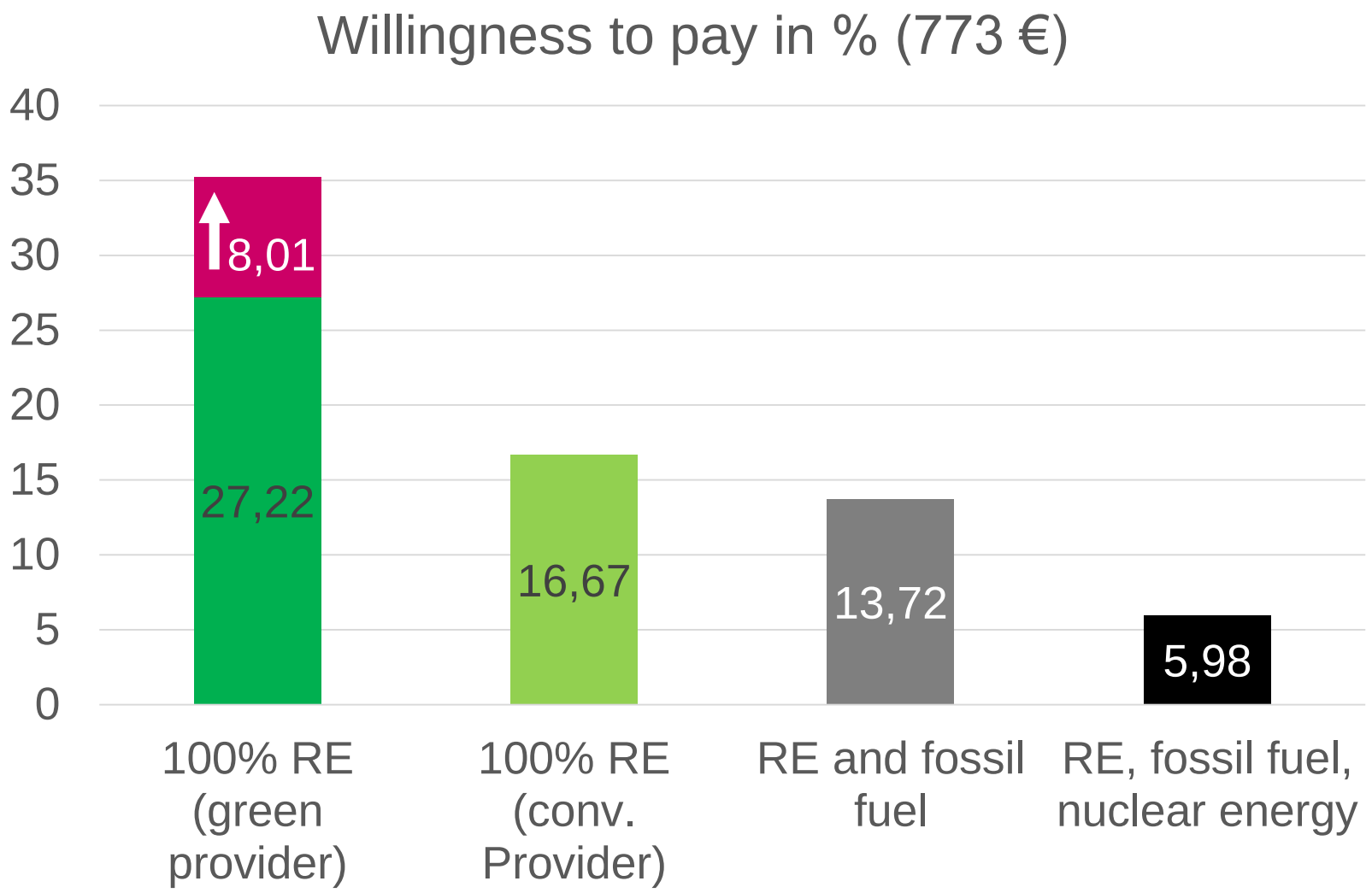
Explanatory variables	Parameter estimates (robust z-statistics)			
	Attribute levels		Env. Prime	Rel. Prime
	Mean	Standard deviation	Mean	Mean
100% renewable energies form a green provider	**0.27*** (12.42)	**0.17*** (12.99)	**0.08** (2.12)	-0.02 (-0.67)
100% renewable energies from a conventional provider	**0.17*** (8.46)	**0.12*** (7.78)	0.04 (1.23)	-0.02 (-0.77)
Mix of renewable energies and fossil energy sources	**0.14*** (7.68)	**0.07*** (1.70)	0.05 (1.43)	-0.00 (-0.15)
Mix of renewable energies, fossil energy sources, and nuclear energy	**0.06*** (3.69)	**0.17*** (15.72)	0.04 (1.25)	-0.01 (-0.53)
Other Attributes	YES	YES	NO	NO
Status quo (current contract)	**0.23*** (22.55)	--	--	--
Number of units (observations)	1088 (6528)			

Only participants with high environmental values (measured in NEP scale)

Willingness to pay (relative cost, full sample)



4. Discussion

Summary

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- High willingness to pay for green electricity tariffs, especially when supplied by a green provider
- Evidence for a causal effect of environmental identity on preferences for green electricity tariffs
- Effects of environmental priming are driven by individuals with a strong environmental identity
- No hint for a causal effect of religious identity on preferences for green electricity tariffs

Policy implications

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- Causal effect of environmental identity on behavior

  → Pronounce environmental identity in policy campaigns regarding environmentally friendly behavior?

  → Pronounce environmental identity in sales discussions or on webpages of electricity providers?

  → Target environmental identity in marketing campaigns

- Transfer high willingness to pay for green electricity (from green providers) into a change of the electricity tariff

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Thank you!

Backup

NEP scale

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- Introduced by Dunlap et al. (2000)
- Indicator based on stated agreement (“totally disagree”, “rather disagree”, “undecided”, “rather agree”, and “totally agree”) with 6 statements:
- “Humans have the right to modify the natural environment to suit their needs”
- “Humans are severely abusing the planet”
- “Plants and animals have the same right to exist as humans”
- “Nature is strong enough to cope with the impacts of modern industrial nations”

NEP scale

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- “Humans were meant to rule over the rest of nature”
- “The balance of nature is very delicate and easily upset”“Humans are severely abusing the planet”
- Dummy variables that take the value one if respondent rather or totally agrees (disagrees) with the respective positively (negatively) formulated statements
- Score calculated by summing up the six dummies