

Energy labels and heuristic decision-making: the role of cognition and energy literacy

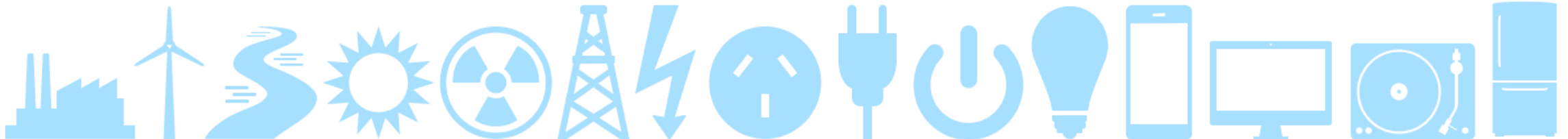
Shutong He, Julia Blasch, Pieter van Beukering, Junfeng Wang

Institute for Environmental Studies (IVM), Vrije Universiteit Amsterdam

Research Center for Resource, Energy and Environmental Policy, Nankai University

BEHAVE 2020-2021

21 April 2021



What are the energy labels in use like?



Figure 1. Different types of comparative labels (Source: Rohling and Schubert, 2013)

- Comparative labels allow a comparison of energy efficiency and other characteristics between products
- Compare by categories: EU, China, Australia, Japan ...
- Compare by a continuous-scale: US, Canada ...

Class valuation effect

- Efficiency classes on categorical-scale labels: intuitive, but invite **heuristic decision-making** i.e., consumers may value the efficiency class *per se* while ignoring more precise information - the difference in energy use, also known as “**class valuation effect**” (Andor et al., 2020)
- Continuous-scale labels: allowing a direct comparison, even when the efficiency levels are close (Schubert and Stadelmann, 2015)

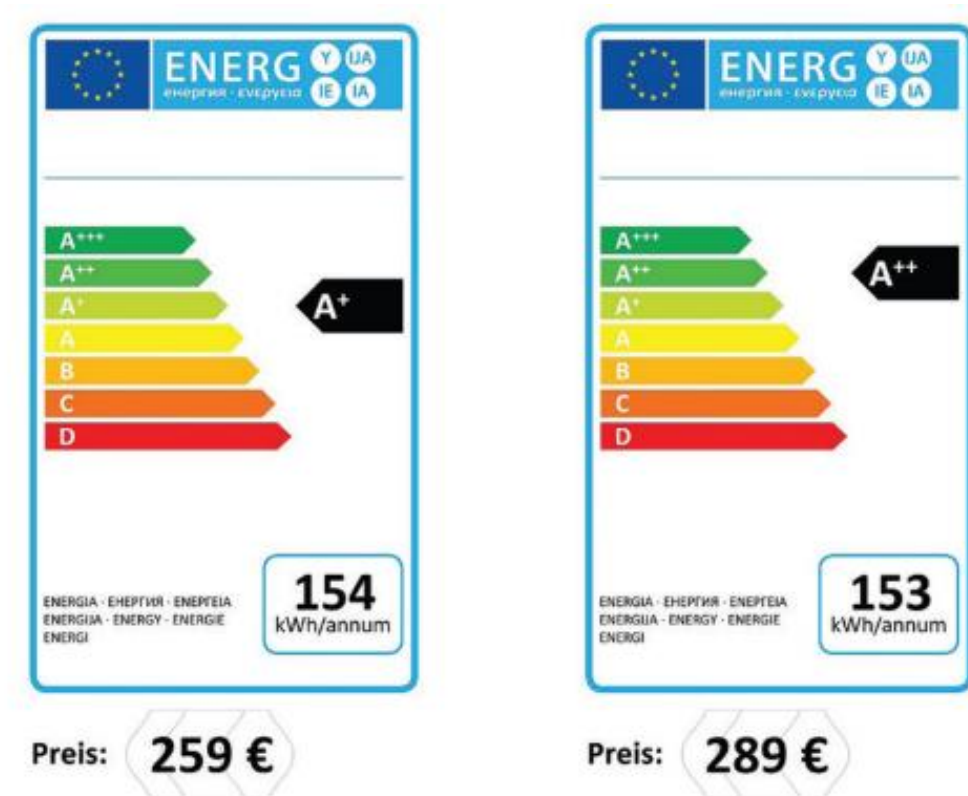


Figure 2. Undistinguishable energy use between products from different efficiency classes (Source: Andor et al., 2020)

Research questions

The systematic differences in the effectiveness of energy labels across countries, specifically

- How effective continuous- vs. categorical-scale labels are in **correcting the heuristics** leading to the class valuation effect?
- How the perception and processing of the information on energy labels relates to an individual's **cognitive style** and **energy literacy**?

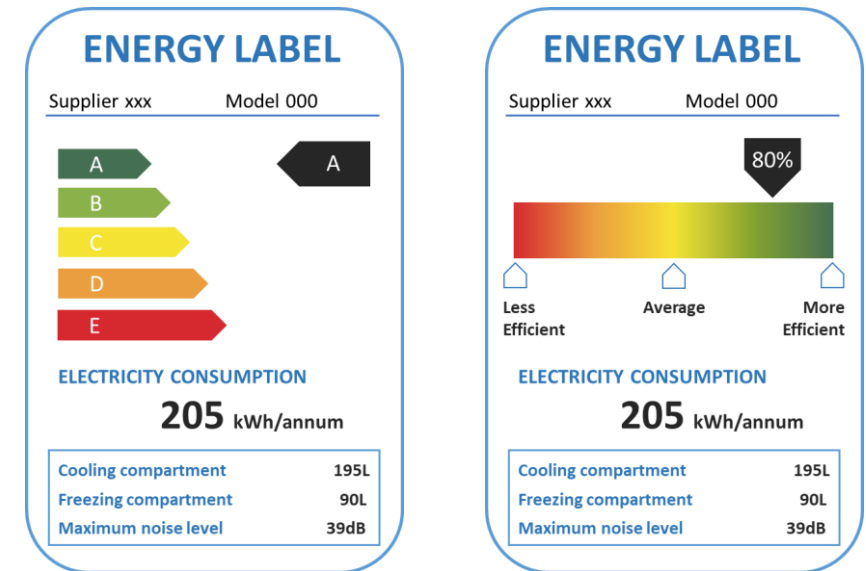


Figure 3. Categorical-scale vs. continuous-scale label

On the following screens, you will see energy-related and cost information of three pairs of refrigerators.

For each pair of the refrigerators, imagine that you are purchasing a new refrigerator and have narrowed down your choice to two that are identical in size and cooling performance.

You are asked to choose the one that minimizes your expenditure during its lifetime.

For an example for a refrigerator including product information see below.

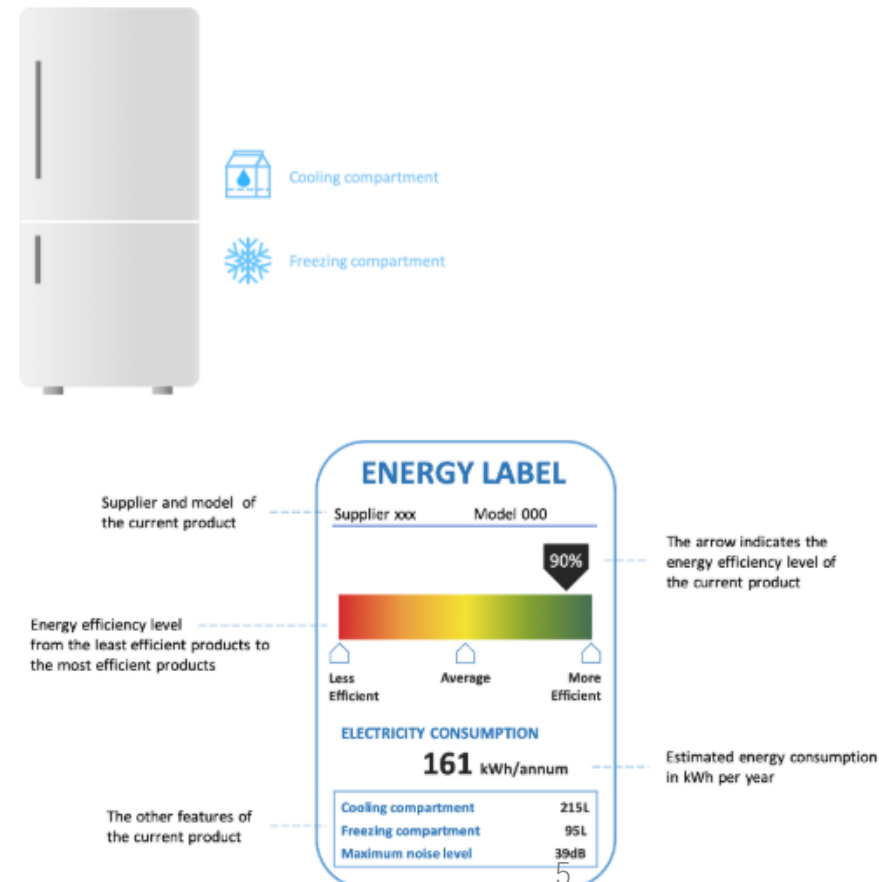


Figure 6. Introductory page of the decision tasks

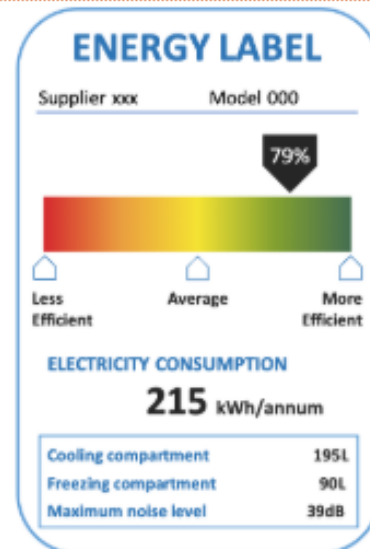
Which one do you think **minimizes your expenditure during its lifetime?**

Suppose that you expect to use the refrigerator for 10 years.

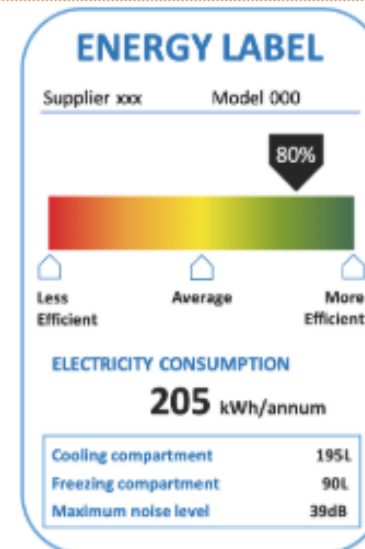
During the 10 years, we assume the electricity price would be 0.16 euro/kWh on average.

The purchase prices of the two products are shown below the product labels.

Lifetime expenditure includes the purchase cost and the electricity cost during the 10 years.



Purchase price: €400



Purchase price: €500



Figure 7. An example of decision tasks (continuous-scale label, situation B)

Decision tasks

- Participants were asked to imagine that they are purchasing a new refrigerator.
- They need to choose the refrigerator between two models that **minimises the expenditure during its lifetime** (i.e., the **cost-efficient model**).
- Participants were randomly assigned to a condition in which the energy rating of the appliances was either presented on a **categorical** or a **continuous** rating scale.

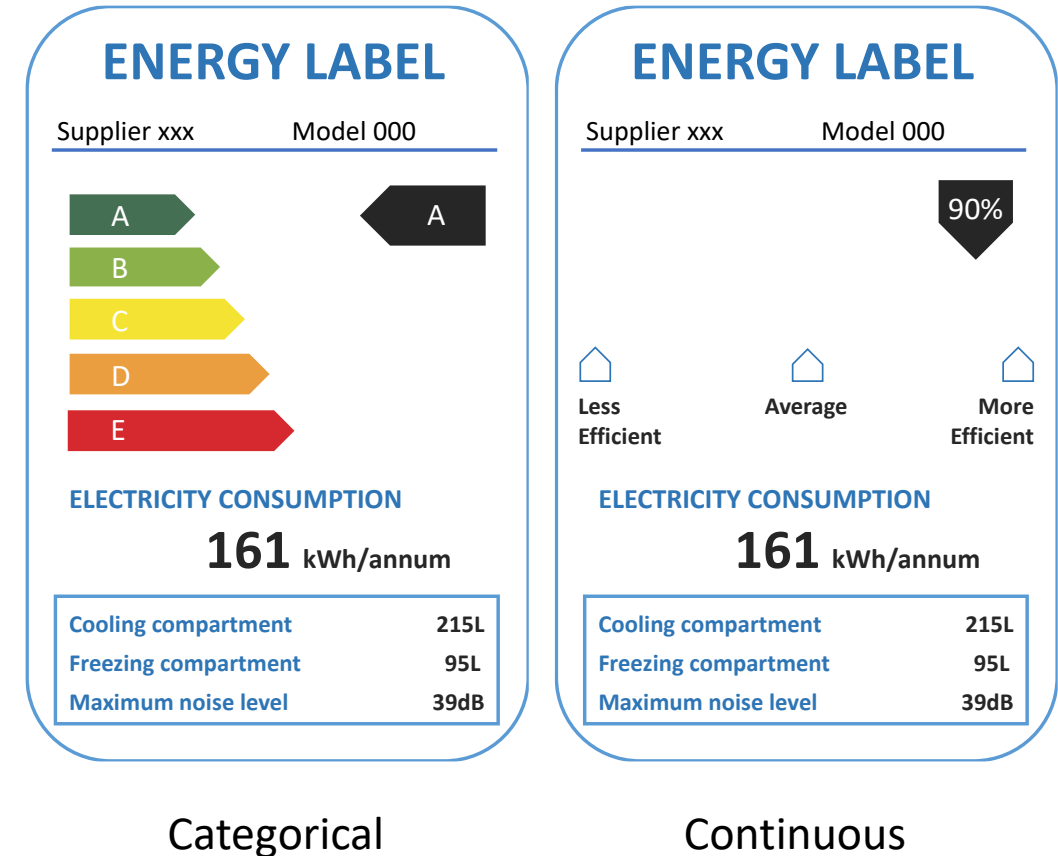


Figure 5. Categorical and continuous-scale labels used in this study

Within-subject situations

- Each subject is asked to make **3 decisions** under different situations (random order)
- **Situation A** (baseline): Both treatment groups see obvious difference in energy efficiency
- **Situation B**: Only with categorical labels treatment can observe a distinction in efficiency
- **Situation C**: Only with continuous-scale treatment can observe a distinction in efficiency

Table 1. Specification of the three decision situations

	Unit	Situation A		Situation B		Situation C	
		A1	A2	B1	B2	C1	C2
Annual energyconsumption	kWh	160	220	205	215	155	210
Energy efficiency class (categorical-scale label)	A-E	A	B	A	B	A	A
Energy efficiency level (continuous-scale label)	%	90%	79%	80%	79%	90%	80%
Purchase cost	Euro	550	400	500	400	600	500
	RMB	2,475	1,800	2,250	1,800	2,700	2,250
Operating cost	Euro	256	352	328	344	248	336
	RMB	1,152	1,584	1,476	1,548	1,116	1,512
Lifetime cost	Euro	806	752	828	744	848	836
	RMB	3,627	3,384	3,726	3,348	3,816	3,762

Survey

- Online survey
- Qualtrics
- Individual-level characteristics are elicited, including
 - socio-demographic information
 - energy literacy (including knowledge, attitude, behaviour) (DeWaters and Powers, 2011)
 - holistic cognitive tendency (Choi, 2003)
 - reasons of making the decision

Sample

- Data are collected in **the Netherlands** (analytical-focal Western) and **China** (the holistic-contextual Asian)
- Survey companies: Motivaction (the Netherlands) and Qualtrics (China)
- We removed responses with a duration less than 5 minutes and those did not pass the attention check.
- Median duration of completion of 17.2 (China) and 16.9 minutes (the Netherlands)
- Both samples are representative for the general urban population in:
 - gender
 - age
- Slightly biased towards higher education and higher income groups

Table 2. Valid responses for each treatment group

	Total	Categorical-scale label	Continuous-scale label
NL	994	497	497
CN	1041	516	525

Overview

- Among the Dutch sample, in situation B, the discrepancy between the label treatments is profound.
- Chinese respondents made more rational decisions in all three situations with a continuous-scale label compared to a categorical-scale label.

The differences between the label treatments and across the situation seem to be minor.

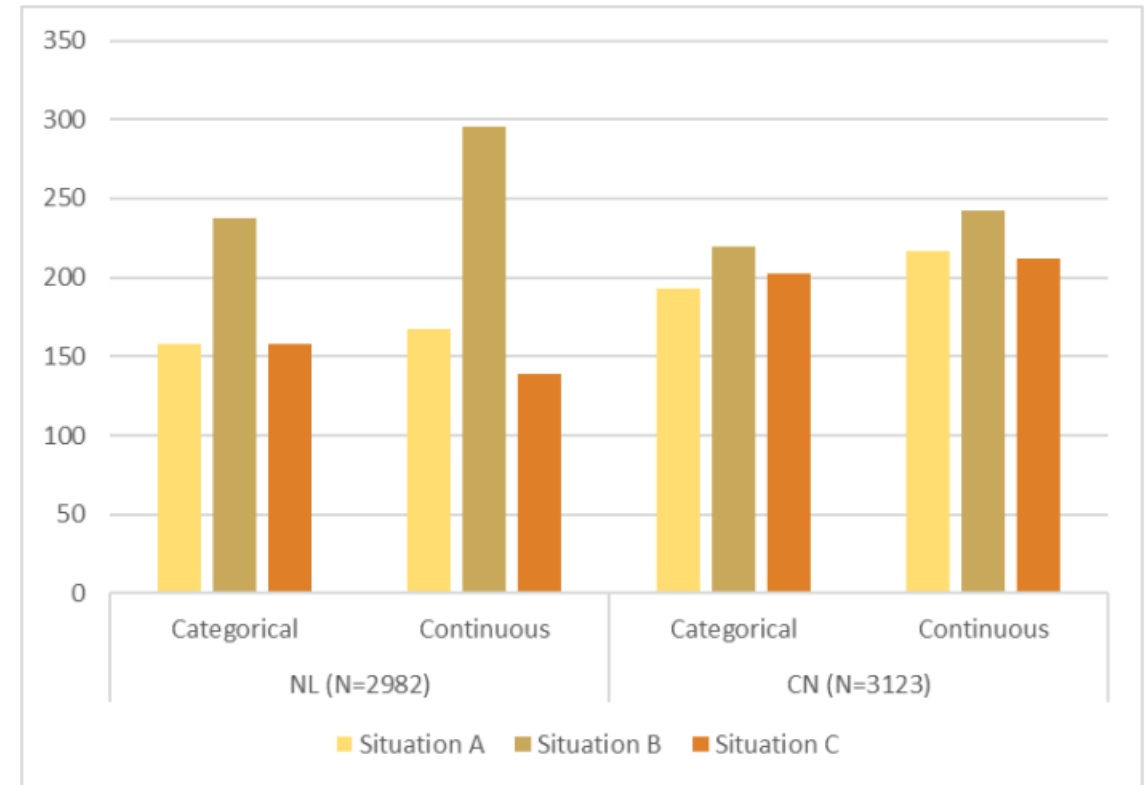


Figure 8. Frequency of rational decisions across the situation

Effectiveness of a continuous visualisation

Table 7. Average partial effect (Model III, continuous-scale label treatment)

	China			Std. Err.	p-value	the Netherlands			Std. Err.	p-value
	Ave.	Par.	Eff.			Ave.	Par.	Eff.		
Decision task variation										
Continuous	0.037			(0.025)	0.138	0.026			(0.018)	0.151

- Overall, indicating energy efficiency with a continuous scale increases the likelihood of rational decision-making by **3.7 and 2.6 percentage points** among the Chinese and the Dutch sample, respectively.
- Both are not significantly different from zero in statistical terms.

Effectiveness of a continuous visualisation

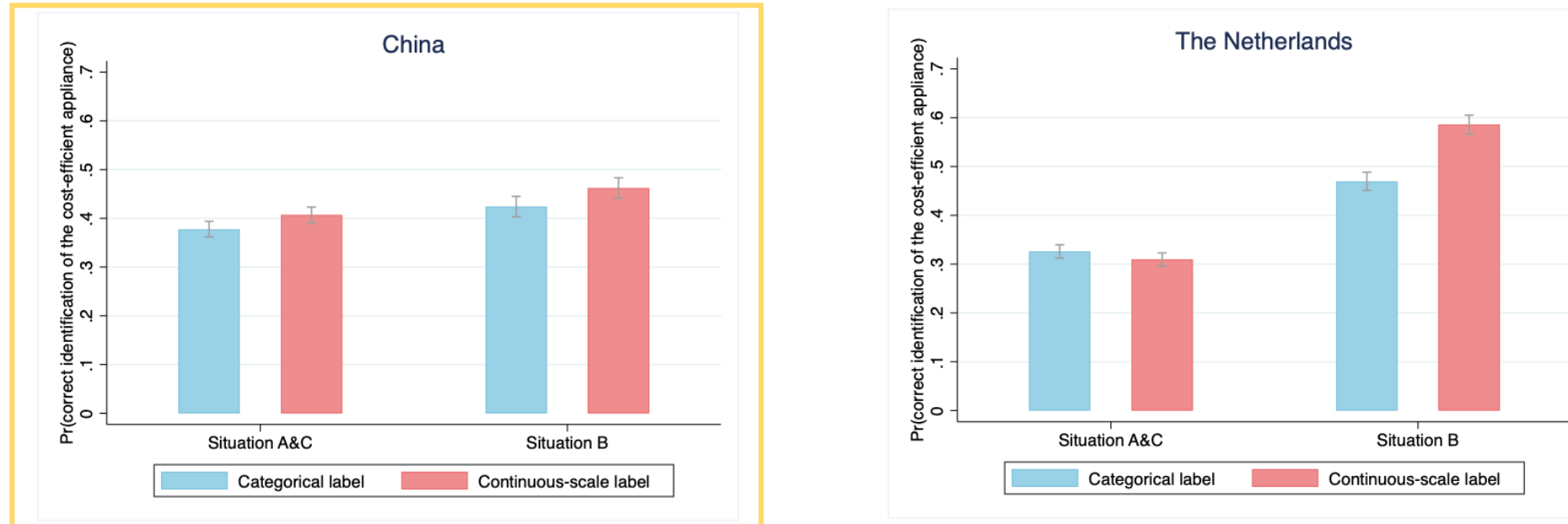


Figure 9. Interaction effect between label treatment and situations

- To examine the *visualisation hypothesis (H1)*, **interaction between continuous-scale label and situation B** is included.
- There is no significant difference of the partial effects of categorical- vs. continuous-scale label between situation A/C and situation B (second difference = 0.009; $p = 0.763$) in the Chinese sample.

Effectiveness of a continuous visualisation

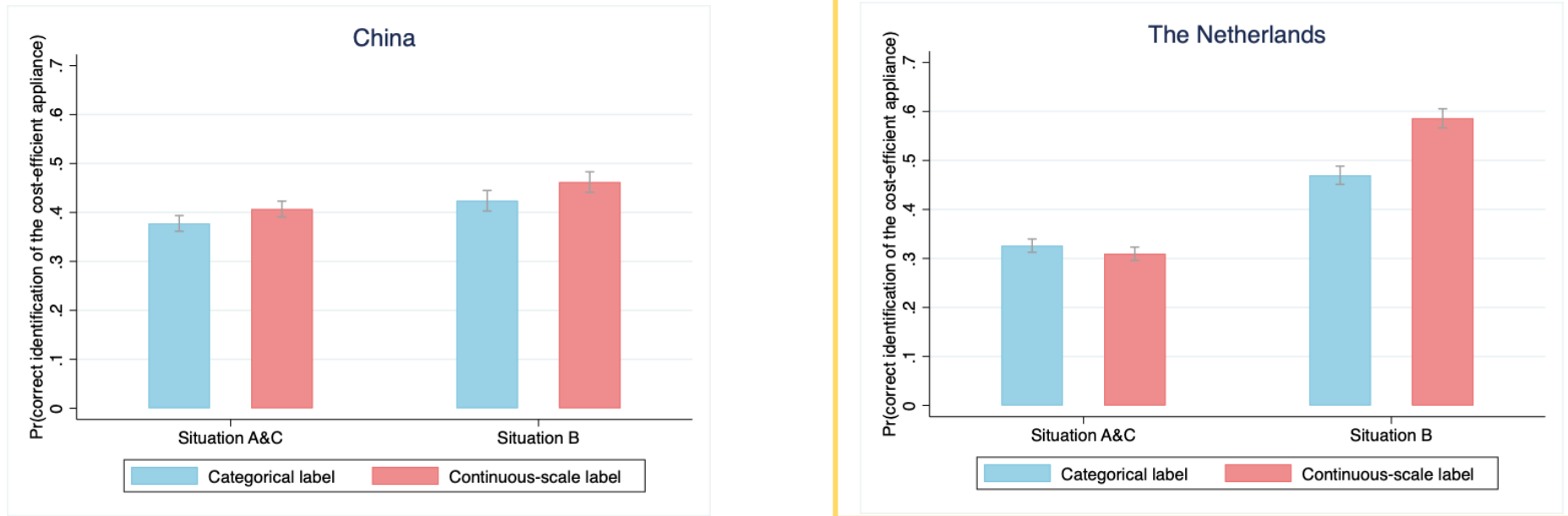


Figure 9. Interaction effect between label treatment and situations

- For the Dutch sample: in situation A/C, probability of making rational decisions is not significantly different between the label treatments (- 0.017; $p = 0.379$), in situation B, the probability under categorical label treatment is significantly lower than under continuous-scale label treatment (0.116; $p < 0.001$).
- Overall, the probability of correct identification with continuous-scale labels is higher under situation B than in situation A/C (second difference = 0.133; $p < 0.001$)

The role of holistic cognitive tendency

How strongly do you agree with the following statements?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Any phenomenon has a numerous number of results although some of the results are not known.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nothing is unrelated.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Any phenomenon has a numerous number of causes although some of the causes are not known.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Even a small change in any element in the universe can lead to substantial alterations in others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Everything in the universe is somehow related to each other.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A marker of good architecture is how harmoniously it blends with other buildings around it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The whole is greater than the sum of its parts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sometimes, the empty space in a painting is just as important as the objects.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Paying attention to the field is more important than paying attention to its elements.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It's not possible to understand the pieces without considering the whole picture.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 10. Screenshot of the survey questionnaire (Choi et al., 2003)

The role of holistic cognitive tendency

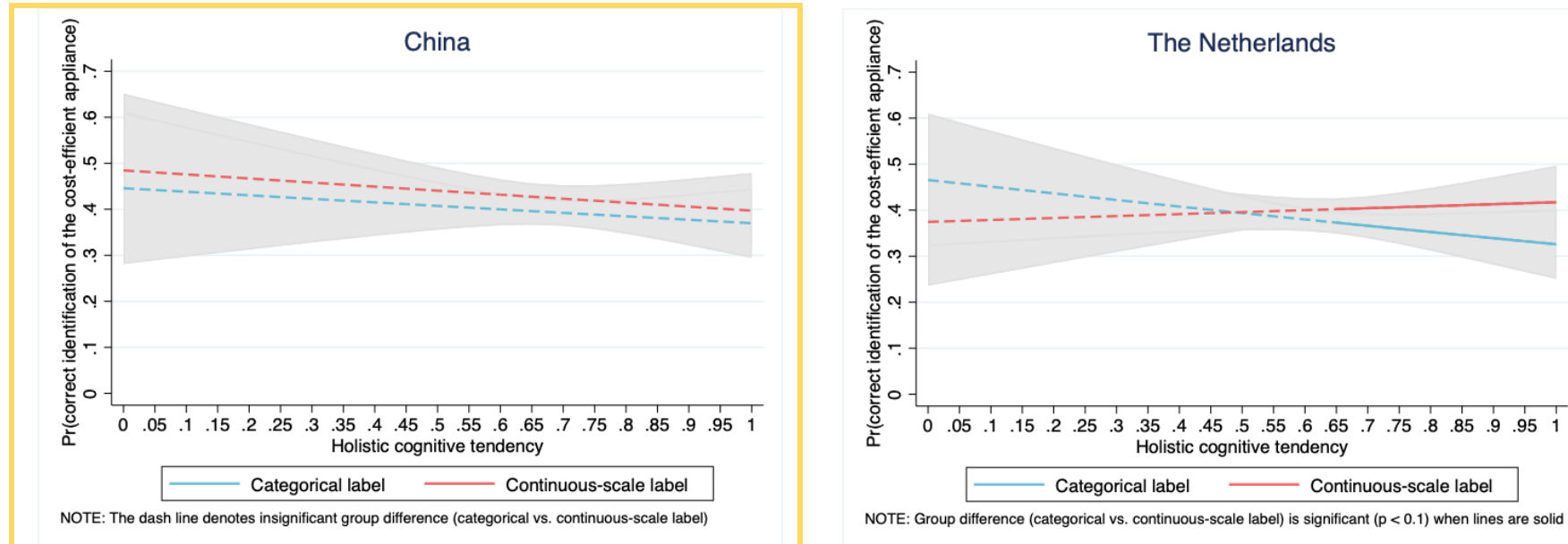


Figure 11. Interaction effect between label treatment and holistic cognitive tendency

- Although the continuous-scale label seems to lead to a higher likelihood of correct identification among individuals with a holistic cognitive tendency of around 0.65, the interaction effect is not statistically significant across the entire range of holistic cognitive tendency for the Chinese sample.

The role of holistic cognitive tendency

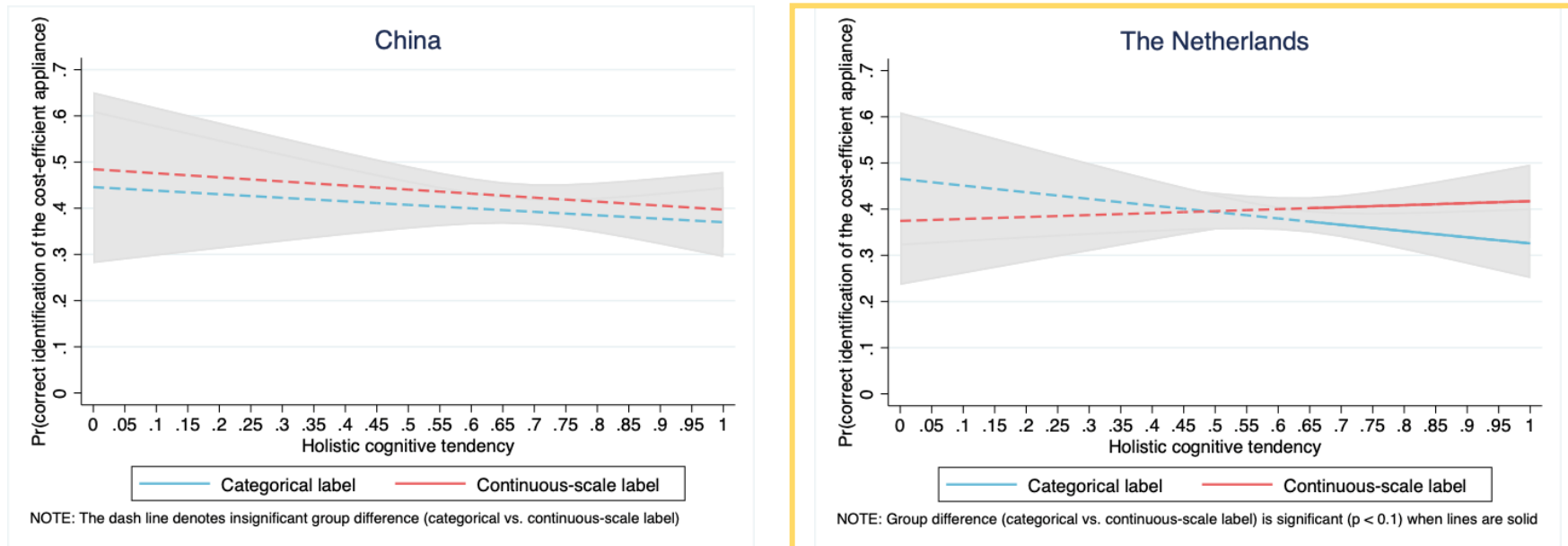


Figure 11. Interaction effect between label treatment and holistic cognitive tendency

- For the Dutch sample, the interaction effect is more profound.
- The partial effect of continuous-scale label treatment is significant at 10%-level among whom holistic cognitive tendency is above 0.65.
- As the holistic cognitive tendency increases from 0.65 to 1, the continuous-scale label increases the probability of making correct identification by 2.9 to 9.1 percentage points.

The role of holistic cognitive tendency

- From a collective perspective, Chinese respondents ($M = 0.68$, $SD = 0.15$) demonstrate higher holistic cognitive tendency compared to Dutch respondents ($M = 0.65$, $SD = 0.12$), $t(1991.7) = 6.06$, $p < 0.01$.
- According to the average partial effects, **a continuous-scale label seems to be more effective for Chinese respondents.**
 - which on average increases the probability of identifying the cost-effective refrigerator by 3.7 percentage points among Chinese sample and 2.6 percentage points among Dutch.
 - However, **the difference between samples is not statistically significant ($p = 0.258$)**, according to the cross-sample test, seemingly unrelated estimation (SUEST) (Mize et al., 2019).

The role of energy literacy

	China			the Netherlands		
	Ave. Par. Eff.	Std. Err.	p-value	Ave. Par. Eff.	Std. Err.	p-value
Energy literacy						
Knowledge_renewable	-0.012	(0.030)	0.678	0.006	(0.021)	0.790
Knowledge_generation	-0.002	(0.033)	0.942	-0.023	(0.019)	0.212
Knowledge_policy	0.103**	(0.041)	0.011	0.051*	(0.027)	0.058
Knowledge_desktop	0.121***	(0.028)	0.000	0.077***	(0.024)	0.001
Knowledge_lightbulb	0.053*	(0.031)	0.080	0.027	(0.020)	0.175
Knowledge_price	-0.001	(0.031)	0.977	0.028	(0.023)	0.233
Attitude	-0.190***	(0.069)	0.006	-0.035	(0.074)	0.639
Norms	-0.103	(0.106)	0.331	-0.012	(0.060)	0.842
Habits	0.045	(0.089)	0.611	-0.063	(0.053)	0.235
Installation	-0.091	(0.057)	0.112	-0.022	(0.037)	0.555

Note: *, **, and *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Table 8. Average partial effects (Model III, energy literacy variables)

- Being familiar with **daily life-related energy policies** and **electricity use of a desktop** among respondents of both countries, which on average increase the probability of correct identifications by **5.1 to 12.1 percentage points**.
- Having **knowledge on LED lightbulbs** is only positive and significant in Chinese sample, with an average partial effect of **5.3 percentage points**.

The role of energy literacy

	China			the Netherlands		
	Ave. Par. Eff.	Std. Err.	p-value	Ave. Par. Eff.	Std. Err.	p-value
Energy literacy						
Knowledge_renewable	-0.012	(0.030)	0.678	0.006	(0.021)	0.790
Knowledge_generation	-0.002	(0.033)	0.942	-0.023	(0.019)	0.212
Knowledge_policy	0.103**	(0.041)	0.011	0.051*	(0.027)	0.058
Knowledge_desktop	0.121***	(0.028)	0.000	0.077***	(0.024)	0.001
Knowledge_lightbulb	0.053*	(0.031)	0.080	0.027	(0.020)	0.175
Knowledge_price	-0.001	(0.031)	0.977	0.028	(0.023)	0.233
Attitude	-0.190***	(0.069)	0.006	-0.035	(0.074)	0.639
Norms	-0.103	(0.106)	0.331	-0.012	(0.060)	0.842
Habits	0.045	(0.089)	0.611	-0.063	(0.053)	0.235
Installation	-0.091	(0.057)	0.112	-0.022	(0.037)	0.555

Note: *, **, and *** denote statistical significance at 10%, 5%, and 1% level, respectively.

- Attitudes toward energy-saving has negative and significant coefficient in Chinese sample
- An increase in energy-saving attitudes tend to decrease the predicted probability of making a rational decision.
- The behavioural dimension of energy literacy shows similar influencing pattern.

Table 8. Average partial effects (Model III, energy literacy variables)

Discussion

- **Insignificant interaction effects within the Chinese sample**
 - There could be **factors beyond analytic vs. holistic cognitive style** influencing the way people process different visualisation.
 - People could **bring their life experiences into the experiment**. In our experiment, Chinese respondents may overall be used to the continuous representation in percentage, whereas Dutch respondents tend to be more familiar with grades.
 - Another possible explanation is that the **annual electricity consumption information drew attention of Chinese participants in particular**.

Discussion

- **Noticeable differences in explanatory power of all three models between China and the Netherlands**
 - In Model III, the McFadden's pseudo- R^2 with the Dutch sample is 0.247, and is 0.067 with the Chinese sample
 - Which implies that there could be other explanatory factors beyond our models are important for the decision-making of Chinese respondents
 - This phenomenon was demonstrated in other studies with multiple samples as well, e.g. Hori et al. (2013) and Thøgersen (2000).

Thanks for your attention 😊
Comments & questions?

Shutong He 贺姝桐
shutong.he@vu.nl

Hypotheses

H1 (visualisation hypothesis) *Energy labels with a continuous rating-scale enable more rational decision making than energy labels with a categorical rating-scale, in particular when two appliances differ only marginally in their energy use.*

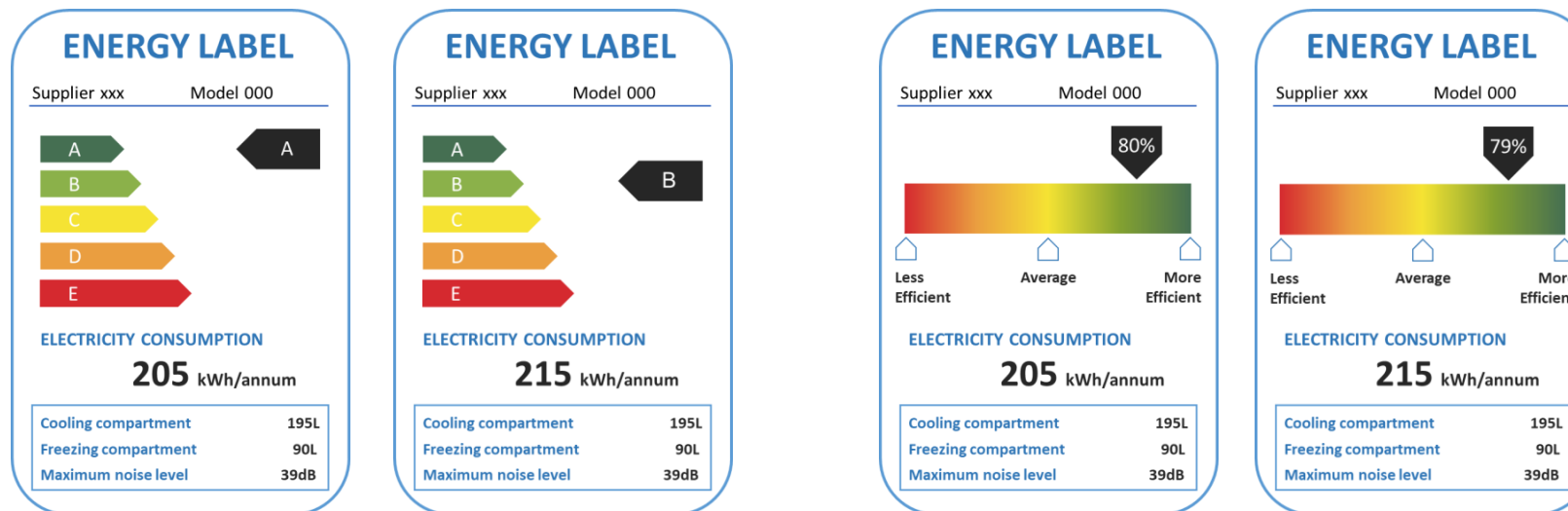


Figure 4. Decision task in situation B with categorical label and continuous-scale label

Hypotheses

H2 (cognitive tendency hypothesis) Energy labels with a continuous rating-scale enable more rational decisions than energy labels with a categorical rating-scale, in particular among individuals with a holistic cognitive style.

- Cultural variation can systematically influence individuals' decision-making (Levinson and Peng, 2007).
- A dominating framework of cultural difference: **Analytic vs. holistic cognitive style** (Masuda and Nisbett, 2001; Ji et al., 2000; Norenzayan and Smith, 2002; Chiu, 1972; Choi et al., 1997).
 - Analytic → Westerners
 - pay attention primarily to the central object
 - use rules and formal logic when categorizing
 - Holistic → East Asians
 - attend to the entire field
 - categorize based on similarity and relationship
 - make less use of categories for the purposes of inductive inference

Hypotheses

H3 (energy literacy hypothesis) Individuals with a high level of energy literacy will be more likely to make rational vs. heuristic decisions based on the information provided on any type of energy label.

- An energy-literate person is considered to be aware of the amount, sources, impacts of the energy use, and can evaluate energy-related information.
- Hence, he/she is able to make conscious energy-related decisions. (U.S. Department of Energy, 2017; DeWaters and Powers, 2011; van den Broek, 2019)
- We adopt a three-dimension measurement of energy literacy:
 - Knowledge
 - Attitudes
 - Behaviours

Results of random-effects probit models

Table 4. Results of the Chinese sample

	Model I		Model II		Model III	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
(Intercept)	-0.457***	(0.074)	-0.232	(0.275)	0.387	(0.362)
Decision task variation						
Continuous	0.110	(0.087)	0.097	(0.357)	0.131	(0.348)
Situation B	0.191***	(0.066)	0.178**	(0.088)	0.177**	(0.088)
Situation C	0.019	(0.066)	0.021	(0.066)	0.021	(0.066)
Cognitive style						
Holistic cognitive tendency			-0.183	(0.456)	-0.291	(0.451)
Energy literacy						
Knowledge_renewable			-0.071	(0.095)	-0.039	(0.093)
Knowledge_generation			-0.107	(0.102)	-0.007	(0.103)
Knowledge_policy			0.302**	(0.125)	0.316**	(0.124)
Knowledge_desktop			0.343***	(0.091)	0.382***	(0.089)
Knowledge_lightbulb			0.210**	(0.095)	0.166*	(0.094)
Knowledge_price			-0.108	(0.093)	-0.003	(0.096)
Attitude			-0.945***	(0.211)	-0.596***	(0.217)
Norms			-0.330	(0.340)	-0.325	(0.335)
Habits			0.484*	(0.278)	0.143	(0.281)
Installation			-0.268	(0.182)	-0.286	(0.180)
Interactions						
Continuous * Situation B			0.028	(0.113)	0.029	(0.113)
Continuous * Holistic cognitive tendency			0.003	(0.508)	-0.037	(0.496)
Other control variables						
Reason_calculate			1.074***	(0.119)	1.125***	(0.118)
Reason_estimate			0.785***	(0.146)	0.770***	(0.143)
Reason_purchase price			0.952***	(0.113)	0.909***	(0.111)
Reason_other			-0.791	(0.808)	-0.781	(0.802)
Trust in labels			-0.087	(0.103)	-0.107	(0.101)
Socio-demographic characteristics						
Age_below 50					0.186	(0.116)
Gender_female					0.033	(0.085)
Education_high					-0.089	(0.130)
Employed					-0.651***	(0.121)
Income_medium					-0.262**	(0.121)
Income_high					-0.212	(0.155)
Household size					-0.518**	(0.237)
One-person household					0.366**	(0.185)
Homeowner					0.175	(0.157)
Number of observations	3123		3123		3123	
Number of groups	1041		1041		1041	
McFadden's pseudo R ²	0.003		0.053		0.067	

Note: *, **, and *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Table 5. Results of the Dutch sample

	Model I		Model II		Model III	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
(Intercept)	-0.898***	(0.101)	-0.966**	(0.380)	-1.057***	(0.394)
Decision task variation						
Continuous	0.157	(0.120)	-0.726	(0.484)	-0.683	(0.481)
Situation B	0.989***	(0.082)	0.688***	(0.101)	0.691***	(0.101)
Situation C	-0.137*	(0.078)	-0.136*	(0.078)	-0.137*	(0.078)
Cognitive style						
Holistic cognitive tendency			-0.767	(0.533)	-0.682	(0.529)
Energy literacy						
Knowledge_renewable			0.094	(0.096)	0.026	(0.097)
Knowledge_generation			-0.103	(0.089)	-0.110	(0.088)
Knowledge_policy			0.258**	(0.121)	0.231*	(0.120)
Knowledge_desktop			0.353***	(0.103)	0.349***	(0.104)
Knowledge_lightbulb			0.100	(0.091)	0.125	(0.091)
Knowledge_price			0.160	(0.105)	0.127	(0.105)
Attitude			-0.133	(0.345)	-0.161	(0.343)
Norms			-0.004	(0.278)	-0.056	(0.280)
Habits			-0.459*	(0.243)	-0.293	(0.247)
Installation			-0.046	(0.168)	-0.101	(0.172)
Interactions						
Continuous * Situation B			0.605***	(0.134)	0.597***	(0.133)
Continuous * Holistic cognitive tendency			0.971	(0.735)	0.895	(0.729)
Other control variables						
Reason_calculate			2.286***	(0.137)	2.217***	(0.135)
Reason_estimate			0.994***	(0.123)	0.958***	(0.123)
Reason_purchase price			2.350***	(0.164)	2.314***	(0.163)
Reason_other			1.083***	(0.204)	1.127***	(0.205)
Trust in labels			-0.049	(0.098)	-0.044	(0.098)
Socio-demographic characteristics						
Age_below 50					0.061	(0.101)
Gender_female					-0.197**	(0.094)
Education_high					0.301***	(0.095)
Employed					0.084	(0.095)
Income_medium					-0.131	(0.107)
Income_high					-0.196*	(0.117)
Household size					0.191	(0.237)
One-person household					0.022	(0.132)
Homeowner					0.027	(0.101)
Number of observations	2982		2982		2982	
Number of groups	994		994		994	
McFadden's pseudo R ²	0.072		0.241		0.247	

Note: *, **, and *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Results of random-effects probit models

Table 6. Average partial effects (Model III)

	China			the Netherlands		
	Ave. Par. Eff.	Std. Err.	p-value	Ave. Par. Eff.	Std. Err.	p-value
Decision task variation						
Continuous	0.037	(0.025)	0.138	0.026	(0.018)	0.151
Situation B	0.062***	(0.021)	0.004	0.224***	(0.018)	0.000
Situation C	0.007	(0.021)	0.752	-0.029*	(0.017)	0.077
Cognitive style						
Holistic cognitive tendency	-0.099	(0.122)	0.417	-0.049	(0.084)	0.560
Energy literacy						
Knowledge_renewable	-0.012	(0.030)	0.678	0.006	(0.021)	0.790
Knowledge_generation	-0.002	(0.033)	0.942	-0.023	(0.019)	0.212
Knowledge_policy	0.103**	(0.041)	0.011	0.051*	(0.027)	0.058
Knowledge_desktop	0.121***	(0.028)	0.000	0.077***	(0.024)	0.001
Knowledge_lightbulb	0.053*	(0.031)	0.080	0.027	(0.020)	0.175
Knowledge_price	-0.001	(0.031)	0.977	0.028	(0.023)	0.233
Attitude	-0.190***	(0.069)	0.006	-0.035	(0.074)	0.639
Norms	-0.103	(0.106)	0.331	-0.012	(0.060)	0.842
Habits	0.045	(0.089)	0.611	-0.063	(0.053)	0.235
Installation	-0.091	(0.057)	0.112	-0.022	(0.037)	0.555
Other control variables						
Reason_calculate	0.367***	(0.034)	0.000	0.581***	(0.025)	0.000
Reason_estimate	0.250***	(0.044)	0.000	0.205***	(0.025)	0.000
Reason_purchase price	0.302***	(0.035)	0.000	0.542***	(0.026)	0.000
Reason_other	-0.214	(0.174)	0.218	0.253***	(0.046)	0.000
Trust in label	-0.034	(0.033)	0.294	-0.009	(0.021)	0.651
Socio-demographic characteristics						
Age_below 50	0.058*	(0.035)	0.100	0.013	(0.022)	0.545
Gender_female	0.011	(0.027)	0.697	-0.043**	(0.021)	0.038
Education_high	-0.028	(0.042)	0.493	0.066***	(0.021)	0.002
Employed	-0.215***	(0.039)	0.000	0.018	(0.020)	0.372
Income_medium	-0.082**	(0.037)	0.026	-0.028	(0.023)	0.217
Income_high	-0.068	(0.049)	0.170	-0.042*	(0.025)	0.091
Household size	-0.165**	(0.075)	0.028	0.041	(0.051)	0.420
One-person household	0.120**	(0.061)	0.050	0.005	(0.028)	0.868
Homeowner	0.055	(0.048)	0.254	0.006	(0.022)	0.788
Number of observations	3123			2982		
Number of groups	1041			994		

Note: *, **, and *** denote statistical significance at 10%, 5%, and 1% level, respectively.

The role of energy literacy

	CN			NL			
	Ave.	Par.	Eff.	Std. Err.	Ave.	Par.	Eff.
Knowledge_renewable	-0.013		(0.020)		0.002		
Knowledge_generation	0.002		(0.022)		-0.022		
Knowledge_policy	0.081***		(0.026)		0.045**		
Knowledge_desktop	0.100***		(0.019)		0.069***		
Knowledge_lightbulb	0.044**		(0.020)		0.025		
Knowledge_price	0.002		(0.020)		0.027		
Attitude	0.148***		(0.045)		-0.031		
Norms	-0.070		(0.071)		-0.004		
Behaviour_practice	0.048		(0.059)		-0.066		
Behaviour_installation	-0.082**		(0.038)		-0.014		

Note: *, **, and *** denote statistical significance at 10%, 5%, and 1%

Table 8. Average partial effects (Model III, energy literacy)

Which one(s) of the following energy policies do you think is currently being implemented in (part of) the Netherlands?

- ☐ Energy label for houses
- ☐ Subsidy for energy-efficient appliances
- ☐ Energy label for household appliances
- ☐ Peak and off-peak tariff or tiered tariff
- ☐ Subsidy or tax reduction for electric vehicles
- ☐ I don't know.

How much do you think it costs in terms of electricity to run a desktop computer for one hour?

- ☐ < 1 kWh
- ☐ 1 ~ 1.5 kWh
- ☐ > 1.5 kWh
- ☐ I don't know

(0.029)

Which one of the following incandescent light bulbs do you think is likely to be equivalent to the given LED light bulb in lighting performance of 800 lumens?



- ☐ A 15-watt incandescent light bulb
- ☐ A 30-watt incandescent light bulb
- ☐ A 60-watt incandescent light bulb
- ☐ An 80-watt incandescent light bulb
- ☐ I don't know