Social norms, morals and self-interest as determinants of pro-environment behaviors: the case of household recycling

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References

1. Czajkowski, M., Kądziela, T., and Hanley, N., 2014. We want to sort! – assessing households' preferences for sorting waste. Resource and Energy Economics, 36(1):290-306.
2. Czajkowski, M., Hanley, N., and Nyborg, K., forthcoming. Social Norms, Morals and Self-interest as Determinants of Pro-environment Behaviours: The Case of Household Recycling. Environmental and Resource Economics.
3. Work in progress

Policy setting:
municipal waste management changes in Poland

- Prior to 2013:
  - Every house owner required to have a contract for having their **sorted** waste collected
  - Not specified how waste is supposed to be sorted (e.g. into how many fractions)
  - In practice – multiple companies operating simultaneously, followed different standards
- New regulations:
  - Waste owned and collected by municipalities (municipal companies or companies selected by municipalities)
  - Introduce per capita waste tax
  - Uniform standard for each municipality

Study #1 – Podkowa Leśna

- Municipality of Podkowa Leśna in Poland
  - One of the suburbs of Warsaw, one of the wealthiest municipalities in Poland
  - Detached houses
  - 1600 households, 3700 inhabitants

- What should the new standard be?
- Sort at home into:
  - no household level sorting
  - 2 fractions (recyclables, non-recyclables)
  - 3-7 fractions (organic, glass, paper, metal, plastic, other)
  - Additional sorting (and screening) performed at professional sorting facilities
- Cost vs. time/trouble/space

Discrete choice experiment

- Contingent scenario
  - Introduction of a new, uniform system of waste collection
- Attributes
  - Number of sorting categories (1, 2, 5)*
    - * The respondents were informed, that in either case the collected waste would undergo a screening process, and due to regulatory requirements, even if it was collected unsorted it would still be sorted in the central professional sorting facility
  - Number of collection times per month (1, 2, 4)
  - Cost (coercive tax, per household, per month)
- Experimental design
  - 6 choice-tasks per respondent
  - 3 alternatives
- Administration
  - Mail survey to every household in Podkowa Leśna
  - 311 of 1605 questionnaires returned (~20% response rate)

Example of a choice card

Choice Situation 1.	Alternative 1	Alternative 2	Alternative 3
Method of sorting in household	Into 5 categories	Into 2 categories	None
Frequency of collection	Once every 4 weeks	Once every 2 weeks	Once every week
Monthly cost for your household	75 PLN	50 PLN	100 PLN
Your choice:	☐	☐	☐

Results #1 – MNL model (WTP-space in EUR)

Variable	Coefficient (s.e.)
Sort in 2 categories (vs. 1)	4.25***
	(0.77)
Sort in 5 categories (vs. 1)	9.03***
	(0.68)
Collect 2 times per month (vs. 1)	5.58***
	(0.69)
Collect 4 times per month (vs. 1)	7.50***
	(0.93)
- Monthly cost per household (EUR) * scale	0.12***
	(0.01)

Results #1 – LC model (WTP-space in EUR)

Variable	Class 1	Class 2	Class 3
	Coefficient (s.e.)	Coefficient (s.e.)	Coefficient (s.e.)
Sort in 2 categories (vs. 1)	18.69*** (2.55)	-1.21 (1.61)	0.42 (0.80)
Sort in 5 categories (vs. 1)	30.05*** (3.48)	-8.91*** (1.74)	1.03 (0.66)
Collect 2 times per month (vs. 1)	7.74*** (1.32)	13.25*** (1.92)	-4.15*** (0.88)
Collect 4 times per month (vs. 1)	13.51*** (2.09)	12.26*** (2.28)	-2.03** (0.84)
- Monthly cost per household (EUR) * scale	0.11*** (0.01)	0.15*** (0.02)	0.45*** (0.07)
Class probability	0.53	0.21	0.26

But why?

- Much work has been undertaken on households' willingness to engage in recycling activity
  - For example, Bruvoll, Halvorsen, and Nyborg (2002) find that most respondents prefer central facility sorting

- Recycling is costly in terms of household time and effort
- Positive WTP for recycling may reflect:
  - Altruism: desire to reduce externalities from other sources of waste disposal, to reduce waste, etc.
  - Cost saving: belief that if everyone complies eventually the cost will decrease
  - Warm glow: utility from action itself, irrespective of outcome
  - … but also – to promote a social image, and a positive self image

- What is the role of moral and social norms in determining recycling behavior?

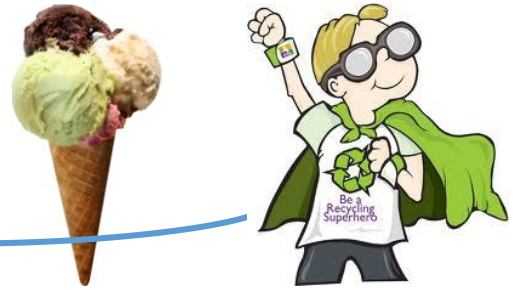
Moral and social norms

- Moral norm – individual sanctions self
- Social norm – sanction comes from others (social pressure)
  - Social norms are “shared views of ideal forms of behavior” (Ostrom, 2000, Biccheri 2006) which individuals are predisposed to comply with
  - Predisposition depends on level of compliance within the relevant group
  - 2 factors matter: what I believe others are doing (% complying) and what I think other people expect me to do (Thorgensen, 2008)

Moral, social and economic motives

- Brekke et al. (2003, 2010), Nyborg (2011) model:
  - Duty-orientated individuals derive utility from an image of themselves as socially responsible people
    - Their recycling actions, which are costly to each person in time and effort, are increasing in the degree to which they believe others are also recycling
  - Recycling motivated by gap between my level of action and the social norm, since warm glow depends on the size of this gap
    - As my level of recycling goes up, I get more of a warm glow
    - But as my perceived sense of responsibility goes up, my utility goes down (I feel I should always do better)
  - Argued it was impossible to separately identify warm glow effects from social norm effects

Moral, social and economic motives



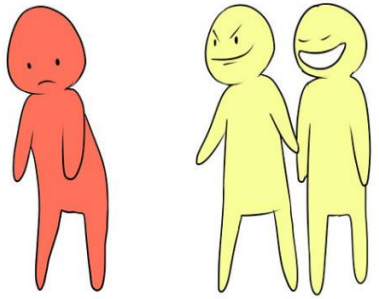
– Budget constraint: $W = c + pg$

– Utility function: $U = u(c, G) + S + J$

– Self image: $S = -a\left(g - g^{*}\right)^{2}$

– Judgement from others: $J = -b\left(g - g^{**}\right)^{2}$

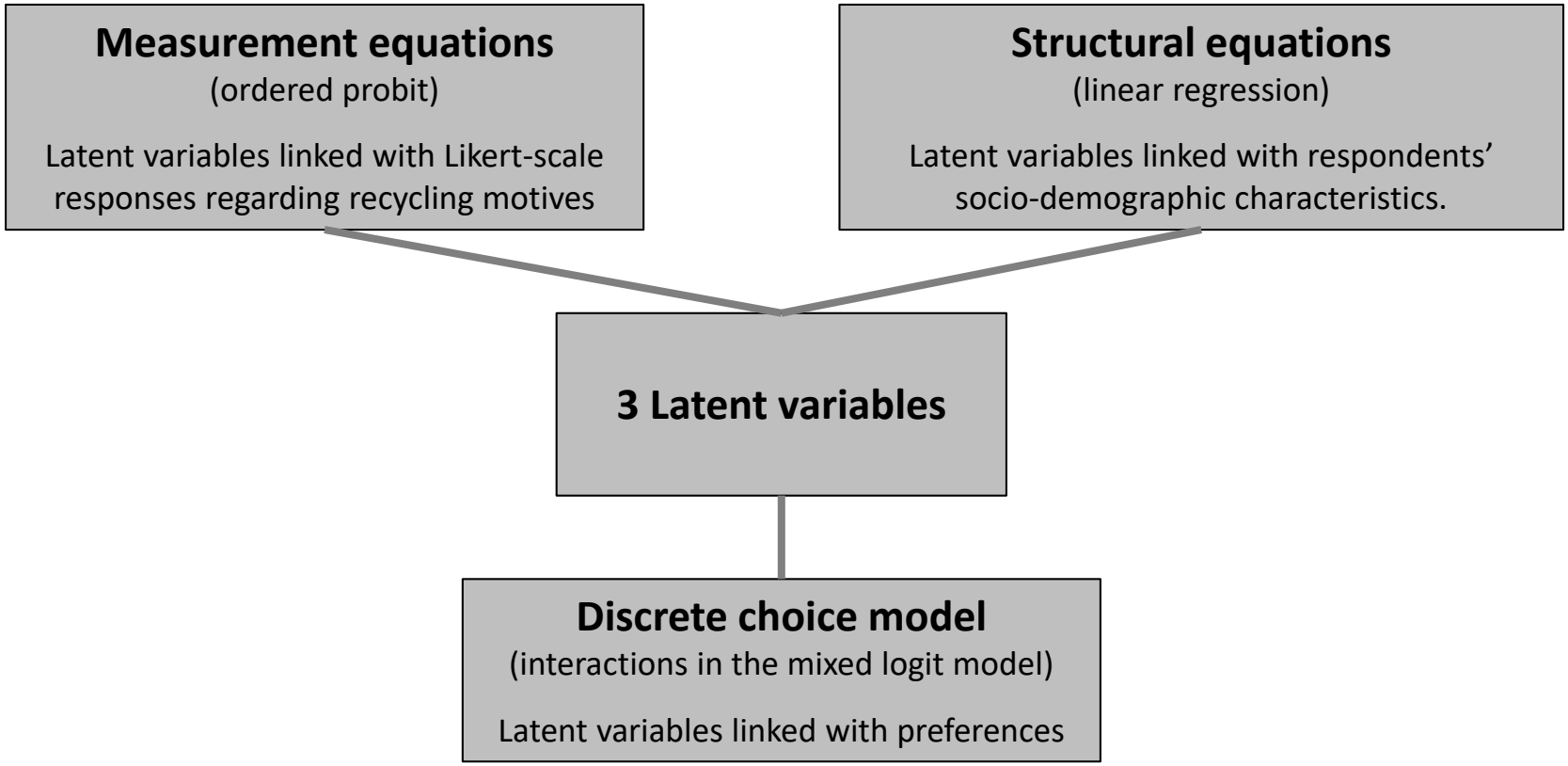
– FOC: $$g = \frac{ag^{*} + bg^{**} - 2pu_{c}^{'}}{a + b}$$



Study #2 – Janówek and Hrubieszów

- The same experimental design and questionnaire
- n = 408, much lower response rate
- Additional debriefing questions eliciting respondents' motives
  - Can be categorized into selfish benefit (SB), social pressures (SP) and moral duties (MD)
    - *Trouble* – Sorting waste at home is troublesome (SB, -)
    - *Satisfaction* – Sorting waste myself will give me satisfaction (SB, +)
    - *Bills* – Sorting waste at home will allow me to (eventually) decrease waste collection bills (SB, +)
    - *N-judge* – My neighbours (would) judge me badly if I do not sort at home (SP, +)
    - *I-judge* – I (would) judge people badly who do not sort at home (SP, +)
    - *Sh-self* – Sorting waste is something everyone should do himself (MD, +)
    - *Moral* – Sorting waste is my moral / ethical duty (MD, +)
  - Additionally –Likert-scale data on whether people thought that
    - Home sorting was more effective than sorting at a central facility (Better)
    - How *Careful* people were in (if) home sorting
    - They were well-informed about how to sort waste into the correct categories (*Know*).

Econometric framework: Hybrid mixed logit



Results #2 – measurement component

	Latent variable 1	Latent variable 2	Latent variable 3	Threshold 1	Threshold 2	Threshold 3	Threshold 4
better	-0.08	0.27**	-0.54***	-1.69***	-1.13***	-0.29	0.76***
troublesome	-0.04	-0.29**	0.44***	-0.99***	-0.16	0.28**	1.17***
satisfying	0.21	0.57**	-1.01***	-1.73***	-1.16***	-0.35	1.05***
careful	0.11	0.76***	-1.35***	-3.09***	-2.62***	-1.63***	0.10
know	-0.12	0.54***	-0.88***	-2.39***	-2.09***	-1.31***	0.12
moral-duty	0.25	0.50	-1.83***	-3.03***	-2.18***	-1.37***	0.52
neighbours-judge	0.66***	-0.54***	-0.62***	-1.42***	-0.78***	0.93**	1.67***
i-judge	1.53***	-0.62	-1.52***	-2.29***	-1.42***	-0.48	1.47
everyone-should	0.63***	0.37	-1.85***	-3.21***	-2.61***	-1.52***	0.54
cost-saving	0.19	0.11	-0.72***	-1.64***	-1.22***	-0.50**	0.33

– LV1 – social pressures

– LV2 – internalized motivation (but not necessarily moral duty)

– LV3 – no social / moral pressures, not better, troublesomeness

Results #2 – structural component

	LV 1 (social pressures)	LV 2 (internalized motivation)	LV 3 (trouble, no pressures)
male	-0.08	-0.08	0.08
age	0.01	-0.21**	-0.13
household size	-0.04	0.22**	0.17**
income	0.57***	0.29	0.12
satisfied city	-0.53***	-0.29	-0.27**
clean city	0.29***	0.21	0.08
ever cleaned	-0.22**	-0.09	-0.12
currently sort	0.21**	0.14	-0.23***
compost	-0.39***	-0.10	-0.15**

Results #2 – discrete choice component

	Main effects		Interactions		
	Means	Standard deviations	LV 1 (social pressures)	LV 2 (internalized motivation)	LV 3 (trouble, no pressures)
Sort in 2 categories (vs. 1)	1.10***	0.01	0.36	0.60**	-0.37
Sort in 5 categories (vs. 1)	1.42***	1.77***	0.30	0.87**	-1.19***
Collect 2 times per month (vs. 1)	0.51***	0.01	1.33***	0.29	0.78***
Collect 4 times per month (vs. 1)	0.14	1.08**	1.56***	0.77***	0.63***
- Monthly cost per household (EUR)	-0.08***	0.05***	-0.01	0.01	0.01**

Results #2 – summary

- We were able to identify 3 major factors (latent variables) which:
  - Explain the variation in respondents' attitudinal responses
  - Can be linked with respondents' socio-demographic characteristics
  - Can be associated with significant differences in respondents' preferences
- LV1 and LV2 both indicate the presence of norm-based motives inconsistent with *homo oeconomicus*
  - LV1 picks up social approval-driven motives to sort ($b > 0$, $g^{**} > 0$)
  - LV2 indicates a mainly moral or intrinsic motivation to sort ($a > 0$, $g^{*} > 0$)
    - Morally ideal contribution g^{*}, is increasing in contributions' perceived social value – nicely consistent with LV2 being associated with believing that sorting at home is satisfying / better than central sorting
- LV3 reflects a motivation *not* to sort at home which can be due either to *homo oeconomicus* preferences, or to a belief that home sorting is neither morally nor socially superior
- Caution: associations are not causal

Conclusions #2

- Many people “want to sort”, preferring to sort their own household waste even when there was a free alternative of getting a central facility to sort for them
- We observe the effects of the underlying norm-based motivation, which fit our conceptual model
  - Moral norms matter
  - The importance of social norms less evident

Current work (study #3) – investigate the importance of social norms further

- We re-run a similar choice experiment with the 8 treatments:
  - Vary the social norm in terms of the level of ambition
    „In 2012 *y* % of households in Poland / your city recycled"
    varying *y* across treatments
  - Vary the social norm in terms of how local it is: Poland vs. your city vs. both
- 3 main cities, over 1,800 respondents
- Study implemented after the new system has already been introduced
- Work in progress

Example of a choice card

Choice Situation 1.	Alternative 1	Alternative 2	Alternative 3	Current system
Method of sorting in household	Into 5 categories	Into 2 categories	None (1 category)	
Frequency of collection	3 times a week	2 times a week	Every day	
Monthly cost for your household	75 PLN	50 PLN	100 PLN	
Your choice:	☐	☐	☐	☐

Results – MXL in WTP-space (EUR)

	Dist.	Mean	S.d.
Status quo alternative constant	Normal	-8.86***	8.59***
Sort in 2 categories (vs. 1)	Normal	2.01***	2.65***
Sort in 3 categories (vs. 1)	Normal	2.15***	3.89***
Sort in 5 categories (vs. 1)	Normal	-0.81***	7.40***
Collect 1 times per week (vs. 0.5)	Normal	1.98***	1.32***
Collect 2 times per week (vs. 0.5)	Normal	2.68***	1.37***
Collect 3 times per week (vs. 0.5)	Normal	3.06***	1.99***
Collect 7 times per week (vs. 0.5)	Normal	2.34***	2.84***
- Monthly cost (EUR) * scale	Log-normal*	-0.69***	1.18***

- Respondents still want to sort
  - Although not necessarily into 5 categories

Results – MXL in WTP-space (EUR)

	Dist.	Mean	S.d.
SQ ASC – currently no sort	Normal	-9.71***	10.57***
SQ ASC – currently sort	Normal	-8.89***	8.28***
Sort in 2 categories (vs. 1) – no sort	Normal	-0.14	3.08***
Sort in 2 categories (vs. 1) – sort	Normal	2.40***	2.76***
Sort in 3 categories (vs. 1) – no sort	Normal	-1.50***	5.47***
Sort in 3 categories (vs. 1) – sort	Normal	2.87***	3.78***
Sort in 5 categories (vs. 1) – no sort	Normal	-5.80***	7.67***
Sort in 5 categories (vs. 1) – sort	Normal	0.21	6.87***
Collect 1 times per week (vs. 0.5)	Normal	2.01***	1.24***
Collect 2 times per week (vs. 0.5)	Normal	2.73***	1.60***
Collect 3 times per week (vs. 0.5)	Normal	3.08***	2.18***
Collect 7 times per week (vs. 0.5)	Normal	2.45***	2.86***
- Monthly cost (EUR) * scale	Log-normal*	-0.66***	1.20***

- Heterogeneous preferences for sorting
  - Explained using respondents' current behavior

Results – MXL in WTP-space (EUR)

	Dist.	Mean	S.d.
SQ ASC – currently no sort	Normal	-8.75***	11.32***
SQ ASC – currently sort in 2	Normal	-10.33***	7.52***
SQ ASC – currently sort in 3	Normal	-11.14***	7.60***
SQ ASC – currently sort in 4+	Normal	-6.54***	8.90***
Sort in 2 categories (vs. 1) – no sort	Normal	-0.15	2.82***
Sort in 2 categories (vs. 1) – sort in 2	Normal	4.10***	3.97***
Sort in 2 categories (vs. 1) – sort in 3	Normal	2.12***	2.13***
Sort in 2 categories (vs. 1) – sort in 4+	Normal	1.98***	1.83***
Sort in 3 categories (vs. 1) – no sort	Normal	-1.91***	5.52***
Sort in 3 categories (vs. 1) – sort in 2	Normal	2.33***	4.22***
Sort in 3 categories (vs. 1) – sort in 3	Normal	3.52***	3.81***
Sort in 3 categories (vs. 1) – sort in 4+	Normal	3.51***	3.34***
Sort in 5 categories (vs. 1) – no sort	Normal	-6.05***	7.53***
Sort in 5 categories (vs. 1) – sort in 2	Normal	-1.96***	7.16***
Sort in 5 categories (vs. 1) – sort in 3	Normal	-0.23	7.34***
Sort in 5 categories (vs. 1) – sort in 4+	Normal	3.46***	6.36***

- Heterogeneous preferences for sorting
  - Substantial inertia effects

Results – MXL in WTP-space (EUR)

	Mean	yes country norm	% country norm	yes local norm	% local norm	yes both country > local	yes both country < local
SQ ASC – currently no sort	-6.39***	-1.38**	2.51**	-3.17***	3.60**	2.99***	3.70***
SQ ASC – … sort in 2	-9.25***	-1.13	-0.74	-1.76	0.41	3.23***	0.82
SQ ASC – sort in 3	-11.73***	-0.41	1.13	0.87	-2.02*	0.51	1.48
SQ ASC – sort in 4+	-4.99***	-0.87	0.93	0.01	0.27	3.59***	-0.74
Sort in 2 – no sort	-0.04	-1.06	4.11***	1.57	-2.41	-0.44	0.35
Sort in 2 – sort in 2	5.16***	-0.40	0.59	-1.35	1.73	2.14	3.57**
Sort in 2 – sort in 3	2.91***	-0.12	0.31	-1.52**	0.46	0.47	1.11
Sort in 2 – sort in 4+	3.13***	-1.18*	0.88	-1.05	0.96	2.91***	0.17
Sort in 3 – no sort	-4.34***	2.00	6.35***	6.25***	-3.79	-4.93***	-5.66***
Sort in 3 – sort in 2	2.75**	-0.16	1.17	-1.70	-0.57	3.62**	2.84**
Sort in 3 – sort in 3	3.63***	0.38	1.47	0.35	1.19	-1.34	-0.72
Sort in 3 – sort in 4+	4.63***	-1.16	1.54	-0.90	0.78	3.17***	0.88
Sort in 5 – no sort	-6.84***	-0.03	1.64	2.46*	-0.07	-1.03	-5.58***
Sort in 5 – sort in 2	-2.40**	0.58	-2.42	-0.64	1.38	2.35	2.37
Sort in 5 – sort in 3	1.75**	-0.76	1.85*	-1.61*	2.59*	0.36	-0.71
Sort in 5 – sort in 4+	2.78***	-1.31*	2.08*	1.14	-2.58*	3.67***	1.65

Results #3 – summary

- The effect of descriptive norms asymmetric for individuals who currently do ‘a lot’ or ‘a little’ of recycling
- The influence of social norms varies for geographically (country vs. local)

Study #3 – further work

- Investigate respondents’ motives using the hybrid choice framework
- Relate the results to existing theories of moral, social and economic incentives
- Control for other sources of heterogeneity?
  - Include respondents’ expectations about norms … :-/

Heads up – our new study on the effects of descriptive norms

- Changes in GMO labelling and availability policy
- Treatments:
  - Vary the social norm in terms of the levels of communicated social trust in GMO safety for heath/environment

    „GM food is safe for my health and that of my family."

    „GM food does not harm the environment."

    „*y*% of citizens agreed with this statement" varying *y* across treatments
  - Vary the social norm in terms of how local it is: Poland vs. EU
  - Levels: 5/25/50/75% for environment, 5/20/35/60% for health
  - We elicited respondents' agreement levels with statements
    - Prior to showing them what the levels are
- Representative sample of 6,600 citizens of Poland

Attributes and levels used in the DCE

Attribute	Description	Levels
Food for direct consumption	such as grains, fruits and vegetables – foods that consist, contain or are made of GMO	1. banning from the market 2. labeling ban 3. voluntary labeling 4. obligatory labeling
Processed foods not directly consumed by humans	not directly consumed by humans, processed in ways that remove DNA and its immediate products (proteins) – foods made "with the help of GMO"	
Commercial products	derived from GMO, not used for food and feed purposes	Reference levels (SQ) : obligatory labeling – food voluntary labeling – all other
Pharmaceutical products	GMO used to produce proteins used as medicines; source of human therapeutics	
Cost	annual cost for respondent's household (prices, taxes)	PLN 10, 20 50, 100 [0 for SQ]

Example of a choice card

Pana wybór:	○	○	○
Sytuacja 5	Wariant 1	Wariant 2	Stan obecny
GMO jako żywność 	brak oznakowania 	dobrowolne oznakowanie 	obowiązkowe oznakowanie 
GMO w produkcji żywności (nie do bezpośredniej konsumpcji) 	zakaz stosowania GMO 	dobrowolne oznakowanie 	dobrowolne oznakowanie 
GMO w produkcji leków 	brak oznakowania 	zakaz stosowania GMO 	dobrowolne oznakowanie 
GMO w produkcji artykułów przemysłowych 	dobrowolne oznakowanie 	obowiązkowe oznakowanie 	dobrowolne oznakowanie 
Dodatkowy roczny koszt dla Pana gospodarstwa domowego 	50 zł	20 zł	0 zł