Adapting Theory of Planned Behavior and Protection Motivation Theory on everyday climate-protection

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What is the problem and why does it matter?

- Importance to take action against climate change (IPPC, 2014)
- Each individual is responsible, but effects of one's behavior take time to become visible (Macovei, 2015) → research on individuals' underlying motivations is needed (Steg et al., 2021)
- Relevant aspects of day-to-day climate protection:

Mobility | Grocery Shopping | Saving Energy at home

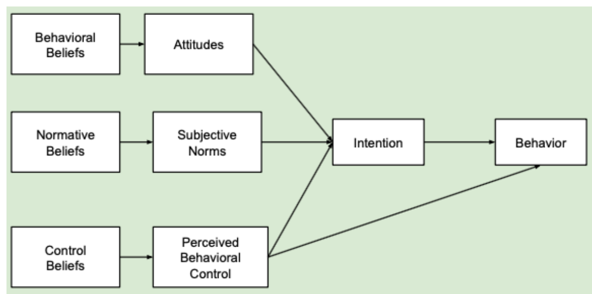
Sample

- N = 134 adults of 3 mid-sized German Cities
- 54 female, M_{age} = 25,8; SD = 20,5
- participated ⌀ 6.7 of 10 days

Theoretical Background

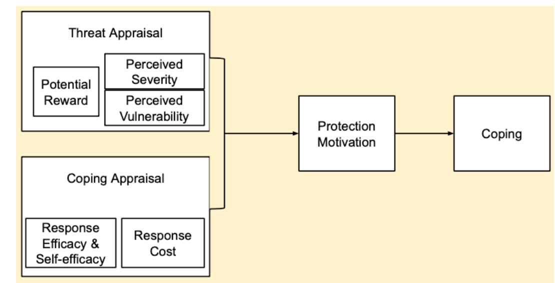
Theory of Planned Behavior (Ajzen, 1985)

- Established theory to explain planned behavior on individual level, also environmental behavior (e.g., Macovei, 2015, Han et al., 2017, Yadav & Pathak, 2017)



Protection Motivation Theory (Rogers, 1975)

- Theory that illustrates how motivation for certain behaviors and the behaviors emerge; has been applied to environmental behavior recently (Bubeck et al., 2012)



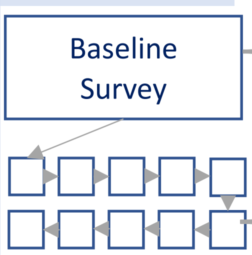
So far:

- Studies using Theory of Planned Behavior or Protection Motivation Theory were generally successful explaining environmental behavior within the aspects of mobility, grocery shopping, and energy conservation so far (e.g., Clement et al., 2014; Shafiei & Maleksaeidi, 2020)
- Some gaps and inconsistent results are left to explain when using the individual theories →A combination of both could close the gaps

Research Aim

Use
Theory of Planned Behavior/Protection Motivation Theory/ an integrated model
to explain day-to-day climate-protective behavior within the aspects of mobility, grocery shopping, and energy conservation at home

Method



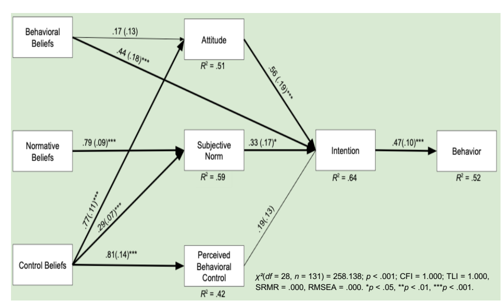
We adapted established scales to assess all components of Theory of Planned behavior (Ajzen, 2006; 21 items ; α = .75-.99) and Protection Motivation Theory (Norman et al. 2015; 7 items; α = .59-.87) for climate-protective mobility, grocery shopping, and energy conservation at home.

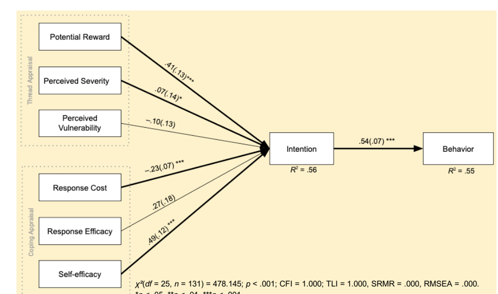
10 days of short daily questionnaires assessing climate-protective behavior in the domains of mobility, grocery shopping, and energy conservation

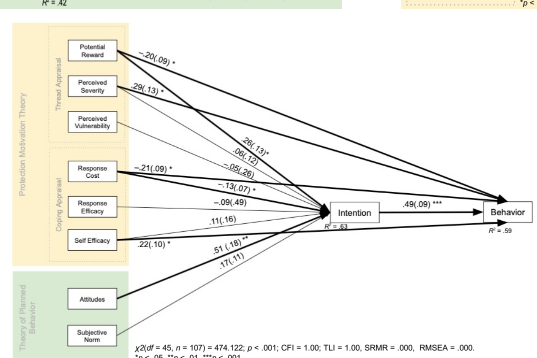
Analysis

Structural Equation Modeling in R (lavaan, R Studio Team, 2021)

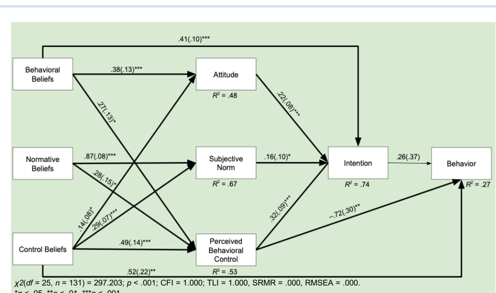
Results (Exemplary)

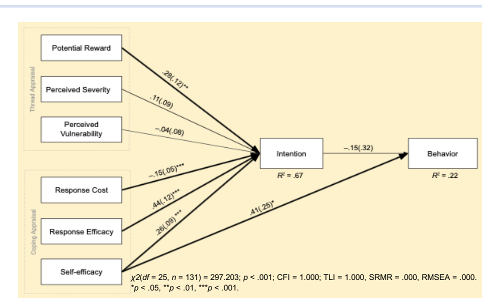


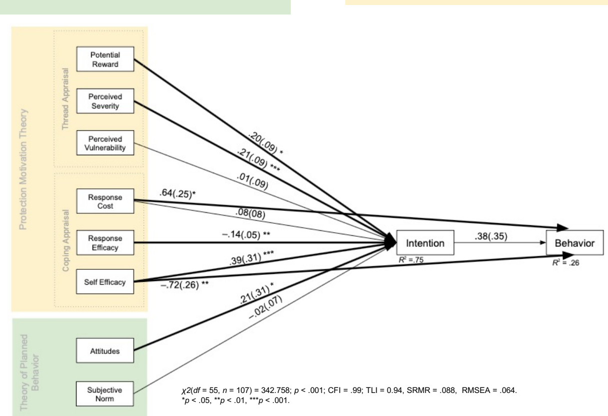




Mobility







Grocery Shopping

Discussion

Mobility:

- Individual and integrated models successfully explain climate-protective mobility intention and behavior (in agreement to Lo et al., 2016); integrated model barely contributed to the explanation (ΔR^2 = .02–.08)
- Potential rewards, self-efficacy, and response costs were particularly relevant to climate-protective intentions (the latter also had a direct influence on reported behavior; consistent with De Groot & Steg, 2007)

Grocery shopping and energy conservation

- Intention could be explained, but not the behavior; intention-action-gap (Yuriev et al., 2020) → Do we lack crucial predictors of intention, or how could the discrepancy between intention and behavior be explained?
- Behavioral and control beliefs, potential reward, and self-efficacy were found to be especially relevant; perceived behavioral control, response efficacy and self-efficacy were directly related to behavior → Relative importance of predictors varies (De Groot & Steg, 2007)

Strengths and Limitations

- Self-report data; insights into specific intentions and behaviors can be measured through this approach
- Sample is mixed in age and gender; Participants mostly from just one city; limited generalizability

Future Directions

- (More) objective assessment of climate-protective behavior
- Exploring Intention-action-gap: Which predictors of behavior might be responsible for it?

Poster, all models, and references

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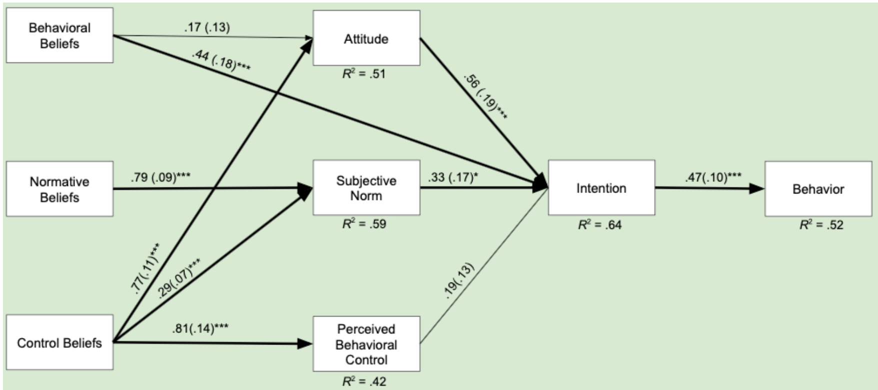
Poster presented at the 52nd DGPs Congress, Hildesheim, Germany

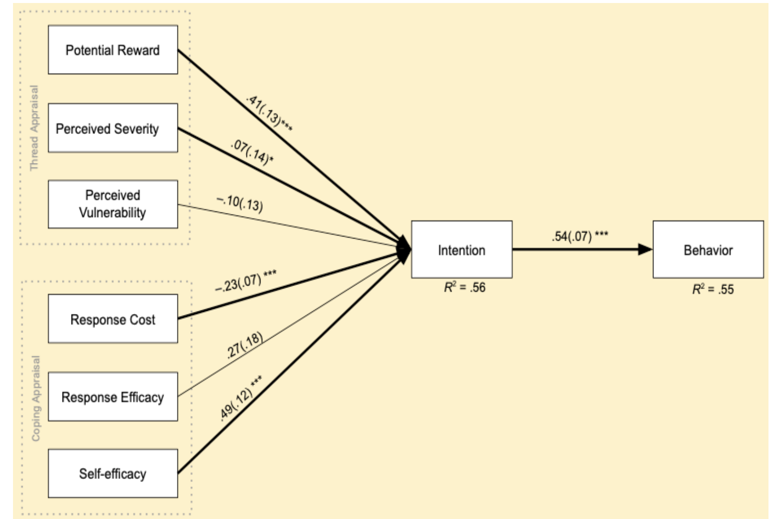
	Items	α	*M*	*SD*	Skew	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
[1] Behavioral beliefs / Self-efficacy		.75	5.67	1.34	−1.14										
	2	.75	5.50	1.39	−1.08										
		.78	5.31	1.51	−0.91										
[2] Normative beliefs		.81	3.91	1.22	0.15	**.48**									
	5	.81	4.21	1.23	0.06	**.46**									
		.83	4.66	1.14	−0.28	**.54**									
[3] Control beliefs / response efficacy		.84	5.81	1.62	−1.52	**.47**	**.35**								
	2	.84	5.49	1.50	−0.96	**.43**	**.37**								
		.87	5.52	1.42	−0.96	**.53**	**.46**								
[4] Attitude towards the behavior		.82	5.08	1.77	−0.70	**.46**	**.37**	**.66**							
	3	.86	5.31	1.25	−0.86	**.53**	**.41**	**.72**							
		.87	5.33	1.28	−0.85	**.62**	**.49**	**.58**							
[5] Subjective norm		.88	4.09	1.41	−0.23	**.36**	**.72**	**.42**	**.50**						
	5	.88	4.25	1.31	−0.21	**.34**	**.74**	**.31**	**.40**						
		.88	4.90	1.22	−0.57	**.41**	**.77**	**.44**	**.42**						
[6] Perceived behavioral control		.81	5.37	1.90	−1.09	**.37**	**.24**	**.69**	**.75**	**.37**					
	2	.81	5.53	1.67	−1.18	**.55**	**.43**	**.63**	**.73**	**.37**					
		.83	5.60	1.54	−1.08	**.38**	**.40**	**.61**	**.65**	**.43**					
[7] Perceived severity						**.34**	**.33**	**.18**	**.22**	**.29**	.02				
	2	.87	5.63	1.38	−1.10	**.38**	**.29**	**.22**	**.25**	**.29**	**.23**				
						.28	**.25**	.06	**.20**	**.26**	.10				
[8] Perceived vulnerability						**.28**	**.36**	**.21**	**.14**	**.33**	.03				
	3	.59	6.89	1.25	−0.48	**.37**	**.27**	.14	**.23**	**.22**	**.14**	**.49**			
						.36	**.27**	**.31**	**.23**	**.20**	**.14**				
[9] Potential reward		-	5.23	1.85	−0.88	**.60**	**.46**	**.42**	**.54**	**.46**	**.50**	**.25**	**.30**		
	1		5.73	1.53	−1.16	**.66**	**.36**	**.37**	**.52**	**.31**	**.44**	**.22**	**.32**		
			5.30	1.63	−0.85	**.59**	**.43**	**.43**	**.54**	**.47**	**.42**	**.18**	**.26**		
[10] Response Cost		-	5.21	1.91	−0.96	**−.22**	**−.20**	**−.22**	**−.43**	**−.22**	**−.32**	−.06	.09	**−.25**	
	1		5.59	1.47	−1.20	−.03	.01	−.07	−.11	−.12	−.07	.11	**−.16**	−.08	
			3.52	1.81	0.20	−.12	**−.19**	**−.24**	**−.28**	−.07	**−.32**	−.10	.04	−.06	
[11] Intention		.99	5.10	2.18	−0.73	**.50**	**.32**	**.60**	**.72**	**.50**	**.66**	**.23**	.12	**.52**	**−.40**
	2	.99	5.08	1.44	−0.66	**.53**	**.39**	**.63**	**.72**	**.42**	**.68**	**.30**	**.25**	**.48**	**−.17**
		.97	5.02	1.60	−0.66	**.49**	**.52**	**.56**	**.69**	**.54**	**.66**	**.20**	**.22**	**.60**	**−.18**

Note. *N* = 134. Values for each category are shown for the three behavioral aspects (from top to bottom: transportation, grocery-shopping, and energy conservation; perceived severity and perceived vulnerability are the same for all three aspects). Significant values are highlighted in bold. Internal consistence is reported with Cronbach's alpha. We modified existing scales (mainly Ajzen, 2006; Norman et al., 2005) based on cognitive interviews. Theoretical range of all scales is from 1 to 7. For clarity reasons, the complex measure of behavior is not reported in this table. For behavior measures, *n* = 784.

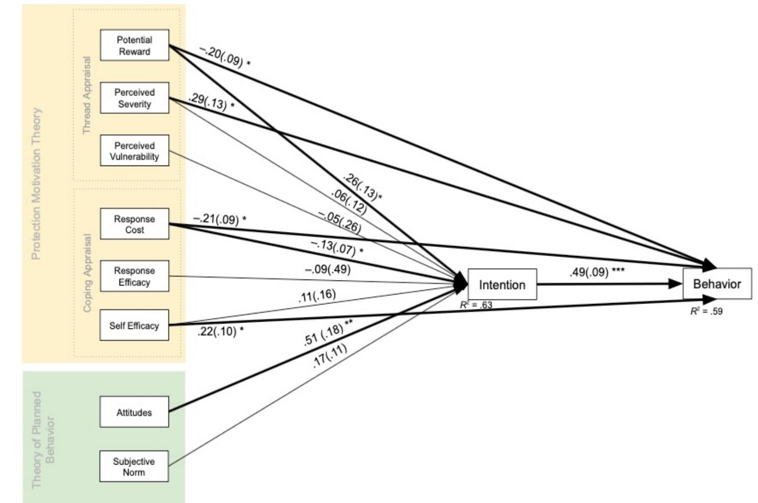
Mobility



χ2(df = 28, n = 131) = 258.138; p < .001; CFI = 1.000; TLI = 1.000, SRMR = .000, RMSEA = .000. *p < .05, **p < .01, ***p < .001.

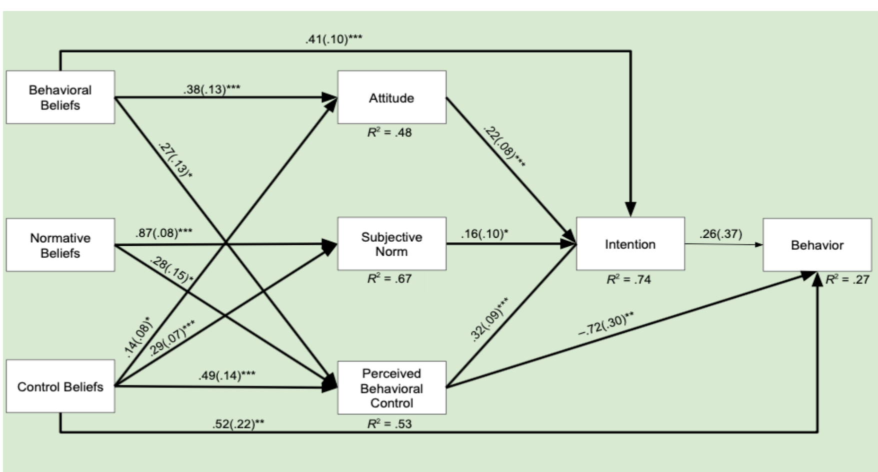


χ2(df = 25, n = 131) = 478.145; p < .001; CFI = 1.000; TLI = 1.000, SRMR = .000, RMSEA = .000. *p < .05, **p < .01, ***p < .001.

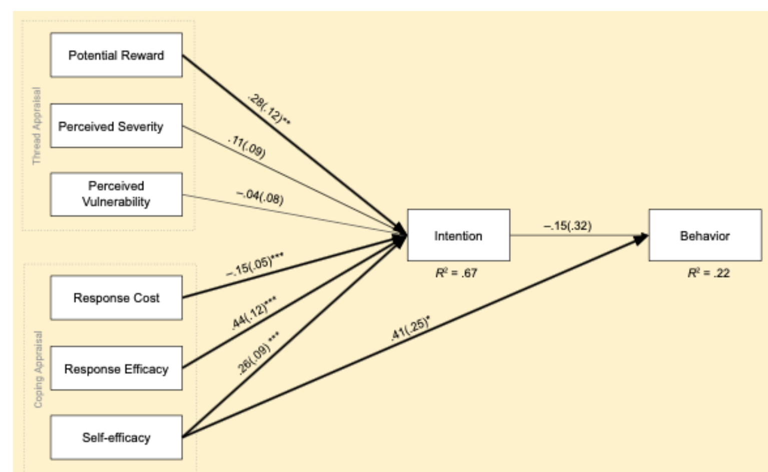


χ2(df = 45, n = 107) = 474.122; p < .001; CFI = 1.00; TLI = 1.00, SRMR = .000, RMSEA = .000. *p < .05, **p < .01, ***p < .001.

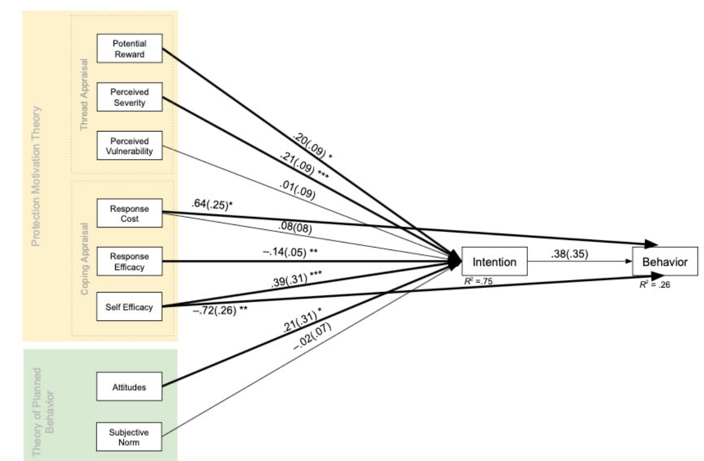
Grocery Shopping



χ2(df = 25, n = 131) = 297.203; p < .001; CFI = 1.000; TLI = 1.000, SRMR = .000, RMSEA = .000. *p < .05, **p < .01, ***p < .001.

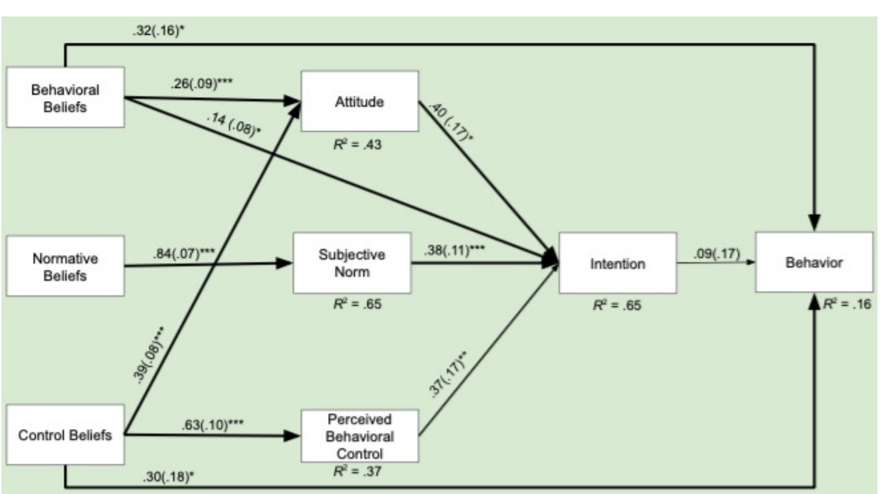


χ2(df = 25, n = 131) = 297.203; p < .001; CFI = 1.000; TLI = 1.000, SRMR = .000, RMSEA = .000 . *p < .05, **p < .01, ***p < .001.

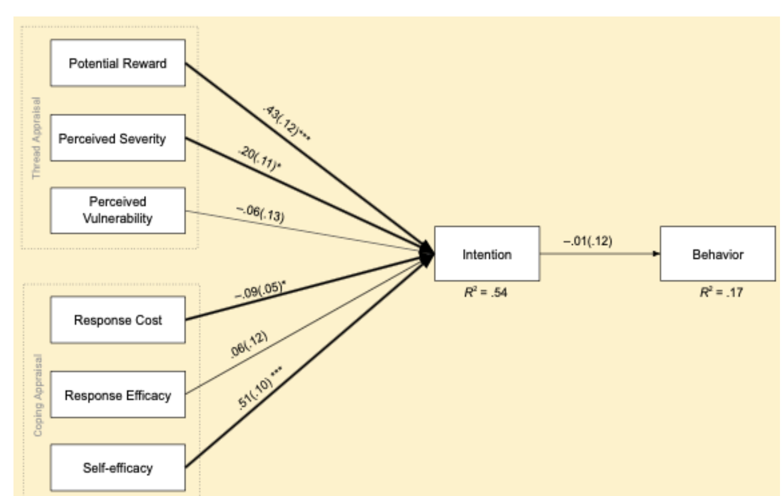


χ2(df = 55, n = 107) = 342.758; p < .001; CFI = .99; TLI = 0.94, SRMR = .088, RMSEA = .064. *p < .05, **p < .01, ***p < .001.

Energy Conservation



χ2(df = 25, n = 131) = 255.745; p < .001; CFI = 1.000; TLI = 1.000, SRMR = .000, RMSEA = .000 . *p < .05, **p < .01, ***p < .001.



χ2(df = 28, n = 131) = 181.619; p < .05; CFI = 1.000; TLI = 1.000, SRMR = .000, RMSEA = .000. *p < .05, **p < .01, ***p < .001.

n.a.

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