Behaviour Change for Resource Conservation

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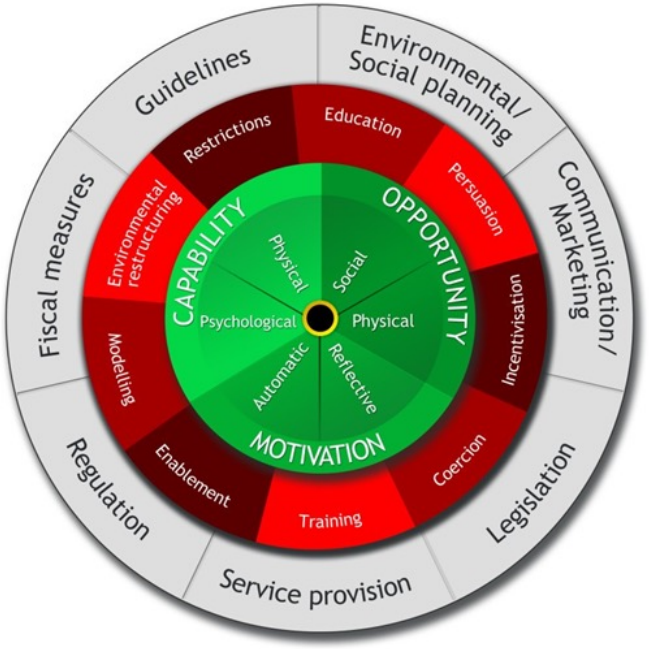
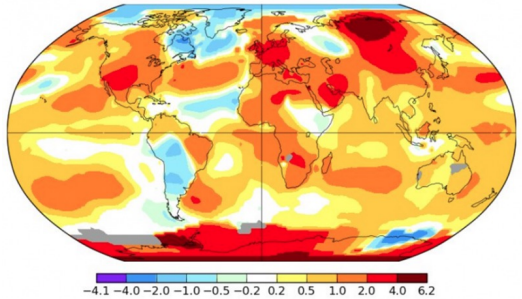


This Presentation

1. Background – Resource Conservation
2. Models of behaviour
3. Behaviour versus behaviour change
4. Upstream and downstream interventions
5. Conclusions

Background

- Almost everything we do consumes materials and energy that have been extracted, processed, and transported
- This (over)consumption leads to environmental problems, such as climate change, waste accumulation in landfills, and pollution – as well as habitat destruction



- Behaviour change critical to ‘net-zero’ transition: not possible without demand-side measures
  - Most measures (60%) needed to reach carbon targets (1.5℃) will require behaviour change by consumers (CCC, 2020)
- Behavioural sciences therefore have role to play – but are limited in their scope
- Presentation gives overview of behaviour/behaviour change theories and possible contributions to resource conservation

(Psychological) Models of (Environmental) Behaviour

- **Models of Reasoned Behaviour**
  - Theory of Planned Behaviour (Ajzen, 1991)
  - Broaden-and-Build theory (Fredrickson, 2001)
- **Models of Moral and Normative Conduct**
  - Schwartz' Value Inventory (1992)
  - Norm Activation Theory (Schwartz, 1977)
  - Value-Belief-Norm Theory (Stern et al, 1999)
  - Focus Theory of Normative Conduct (Cialdini et al., 1990)
- **Integrated Models**
  - Goal-Framing Theory (Steg et al., 2012)
  - Attitude-Behaviour-Context Model (Stern & Oskamp, 1987)
  - Motivation-Opportunity-Abilities Model (Ölander & Thøgerson, 1995)
  - Capability, Opportunity, Motivations (COM-B) Model (Michie et al., 2011)

Jackson, T. (2005). Motivating sustainable consumption. Sustainable Development Research Network, 29(1), 30-40. https://timjackson.org.uk/wp-content/uploads/2018/04/Jackson.-2005.-Motivating-Sustainable-Consumption.pdf

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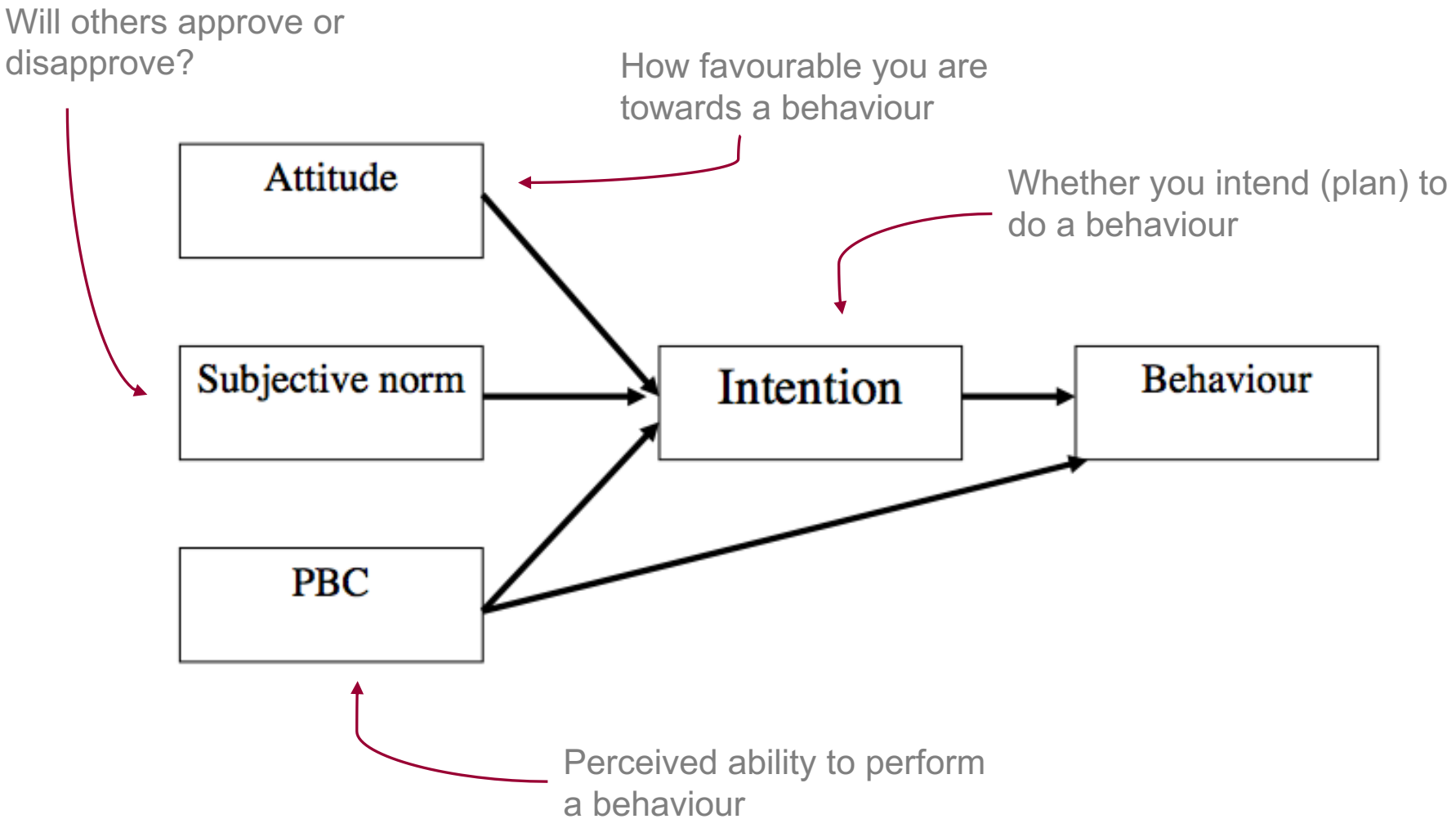
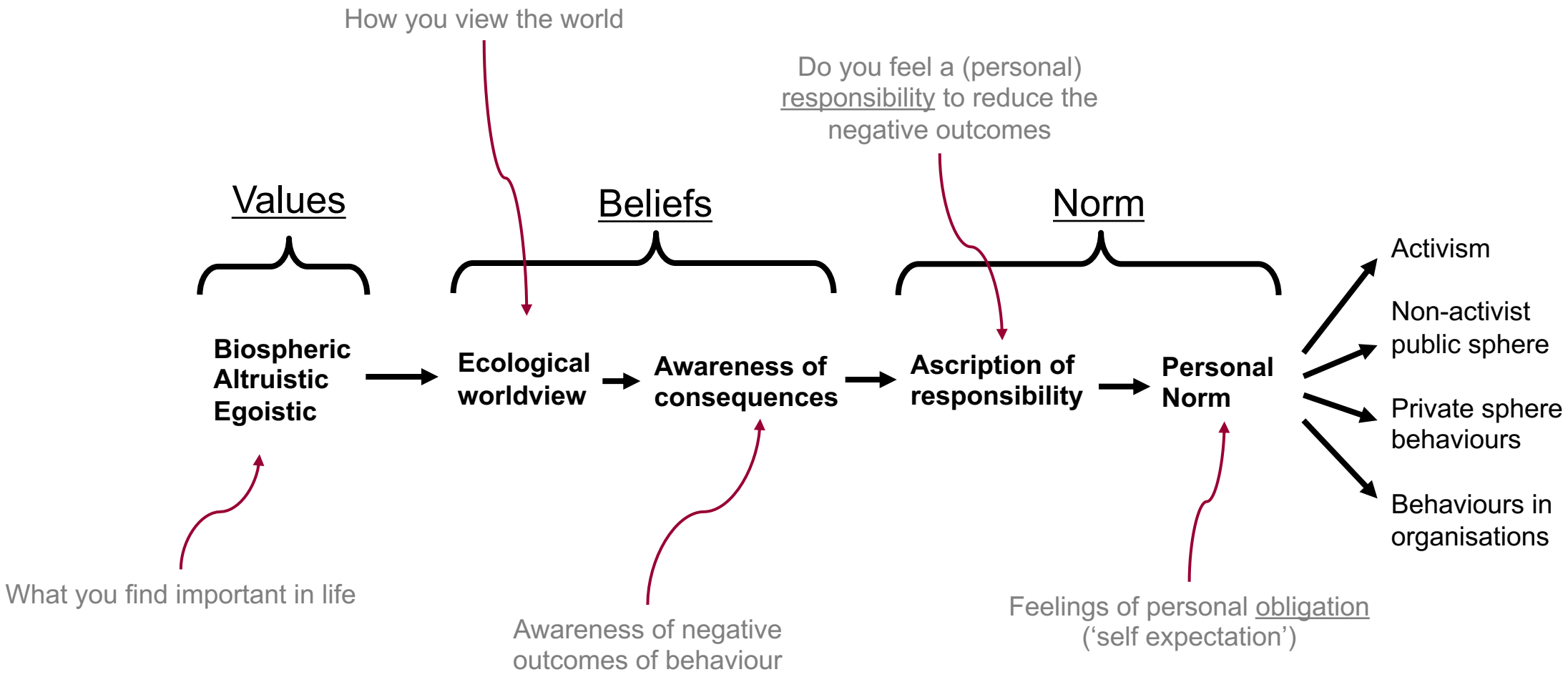
Theory of Planned Behaviour (TPB)



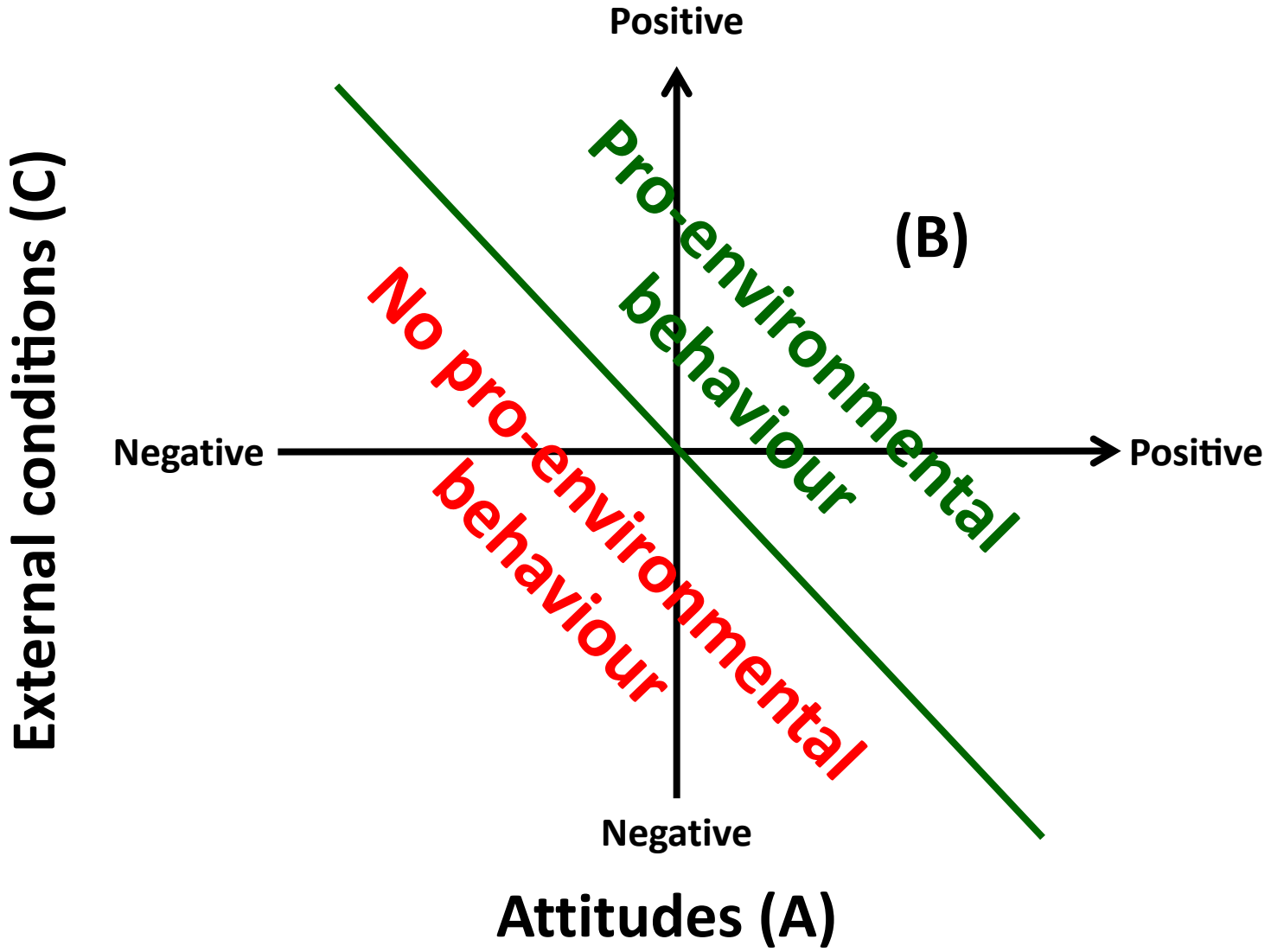
Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), Action control: From cognition to behavior. Berlin, Heidelber, New York: Springer-Verlag. (pp. 11-39).

Value-Belief-Norms (VBN) Model



Stern, P. C. (2000). New environmental theories: toward a coherent theory of environmentally significant behavior. Journal of Social Issues, 56(3), 407-424.

The Attitudes-Behaviour-Context (ABC) model

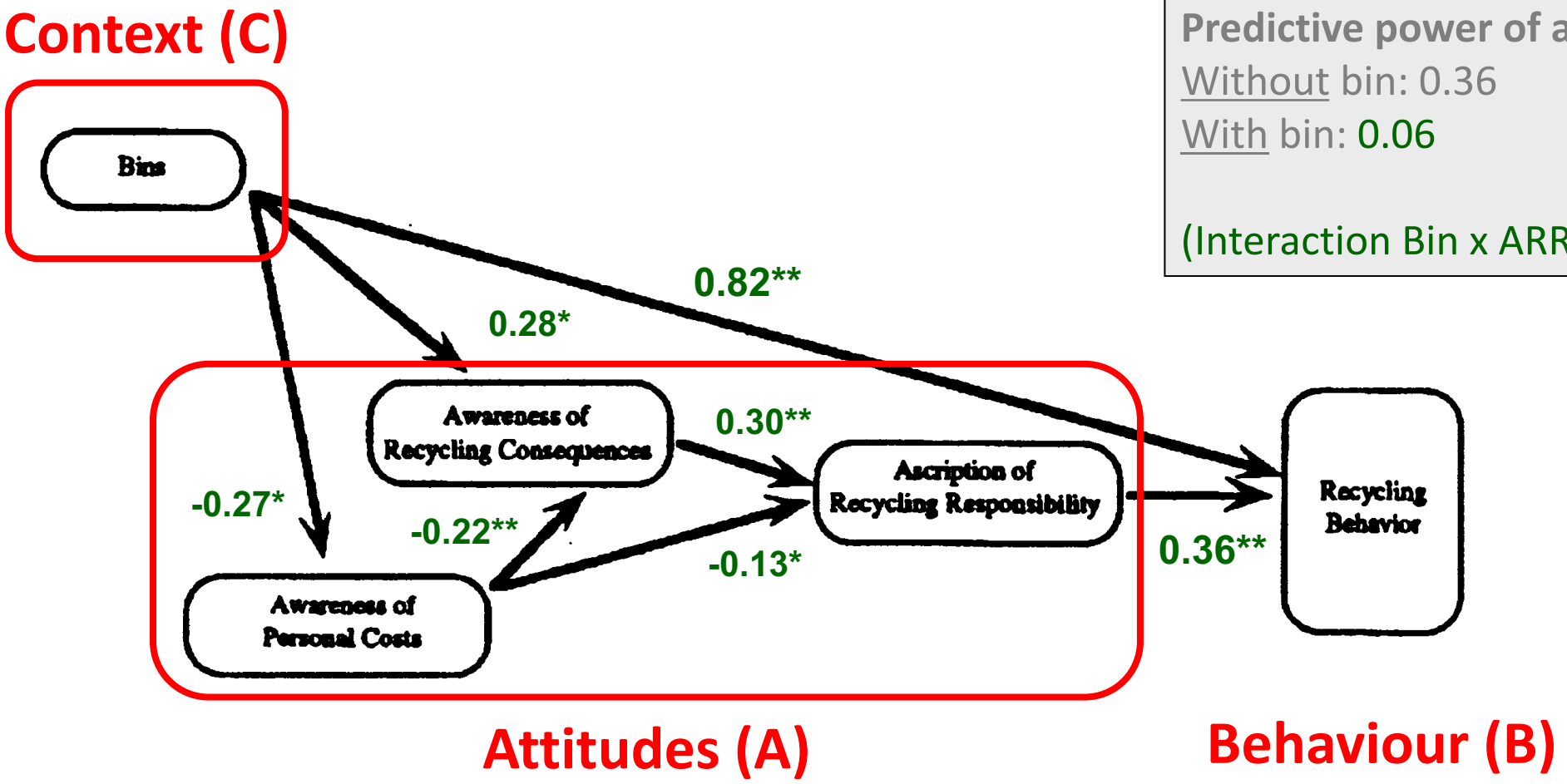


Stern, P.C. (2000). Towards a coherent theory of environmentally significant behavior. Journal of Social Issues, 56(3), 407-42

The Attitudes-Behaviour-Context (ABC) model

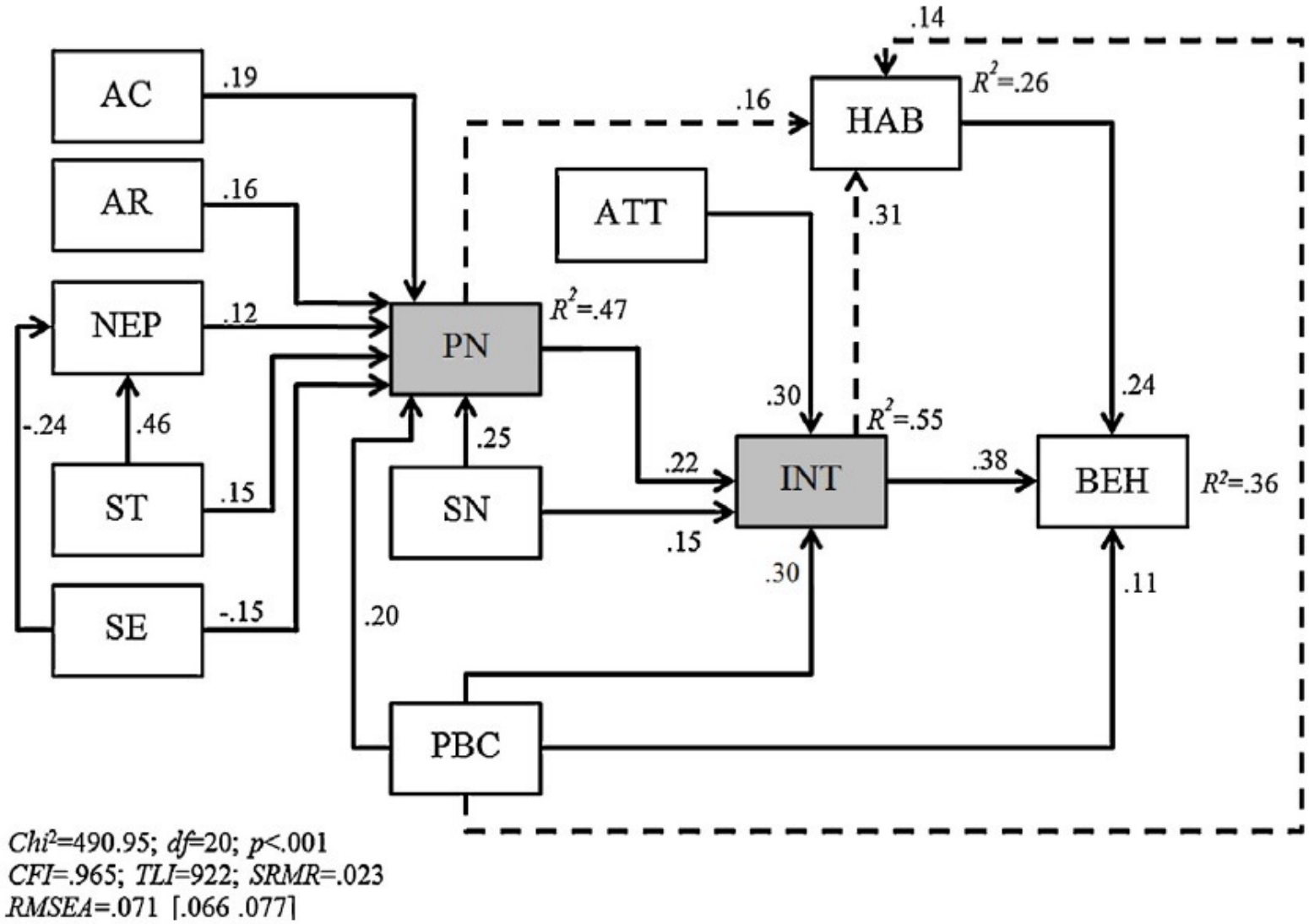
Predictive power of attitudes:
Without bin: 0.36
With bin: 0.06

(Interaction Bin x ARR: -0.30*)



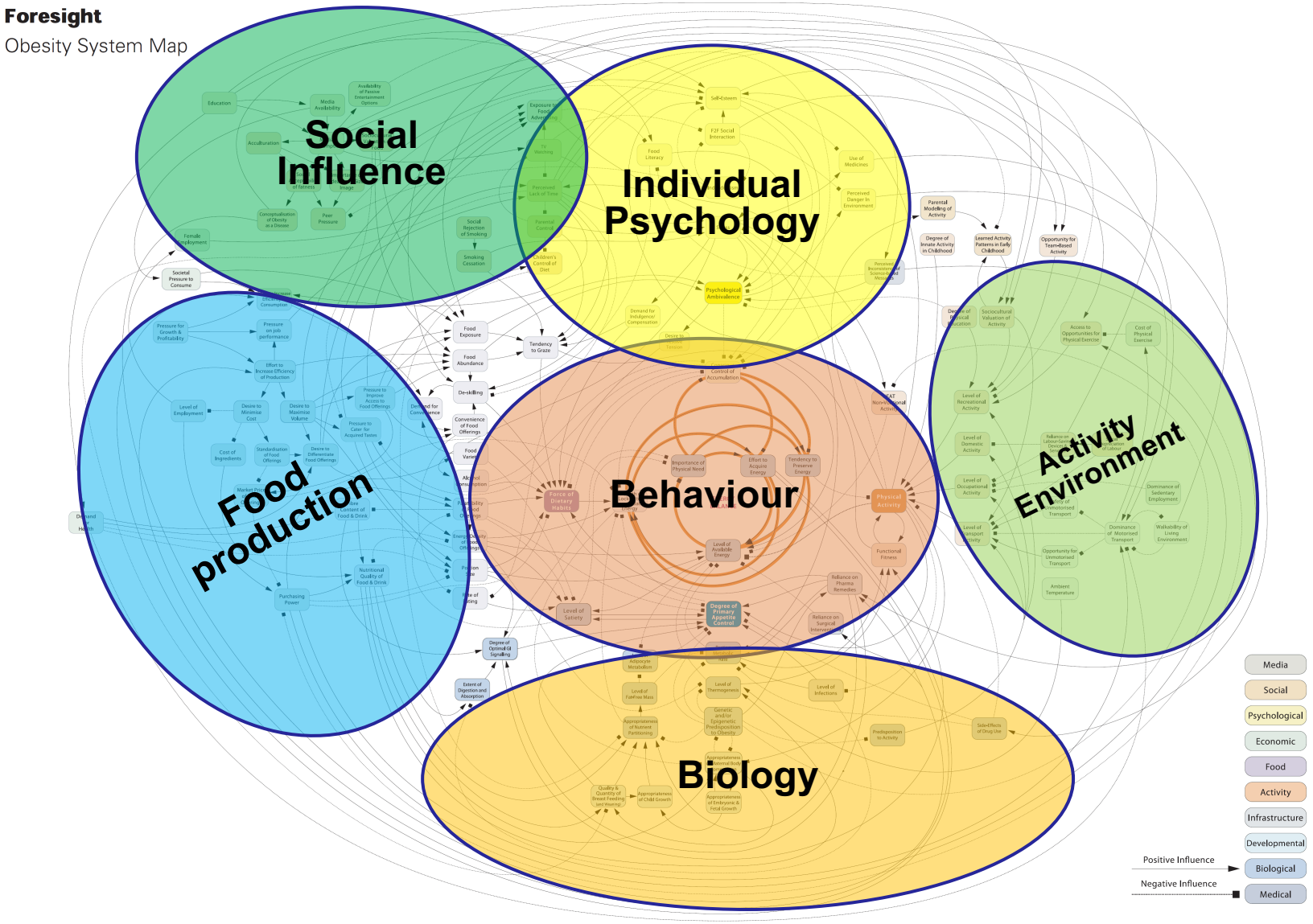
Guagnano et al (1995). Influences on Attitude-Behavior Relationships. Environment and Behavior, 27(5), 699-718

Behaviour is Complex



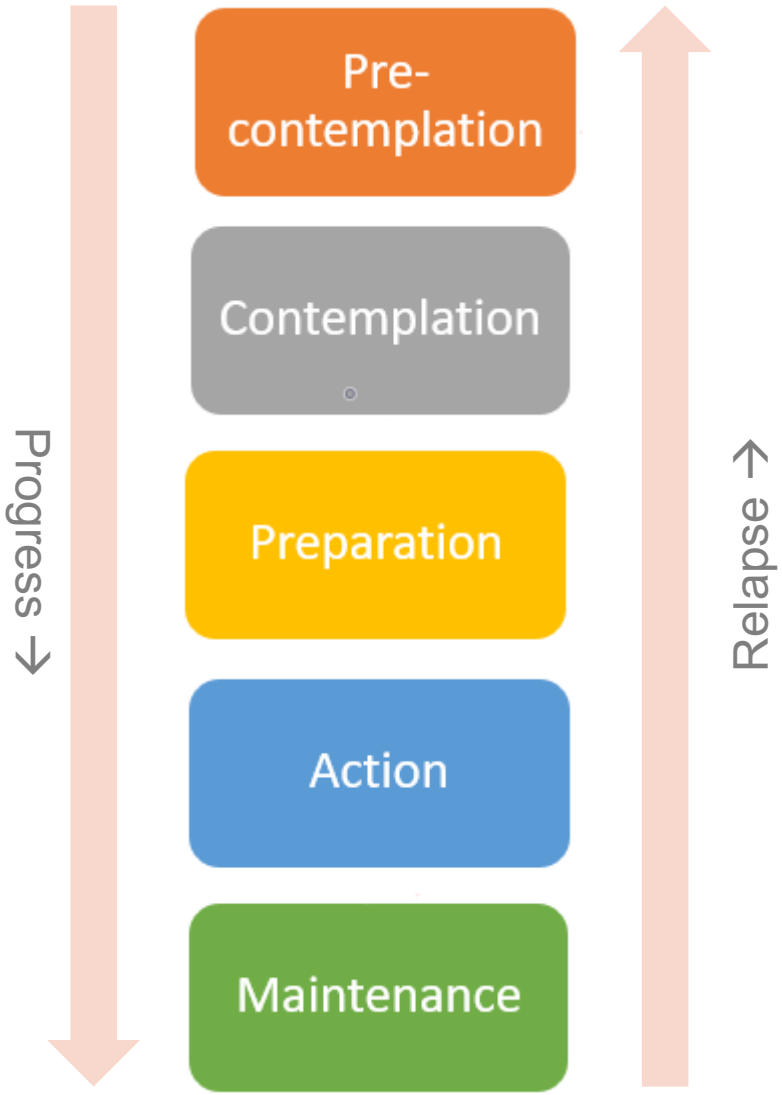
Klöckner, C. A. (2013). A comprehensive model of the psychology of environmental behaviour—A meta-analysis. Global Environmental Change, 23(5), 1028-1038.

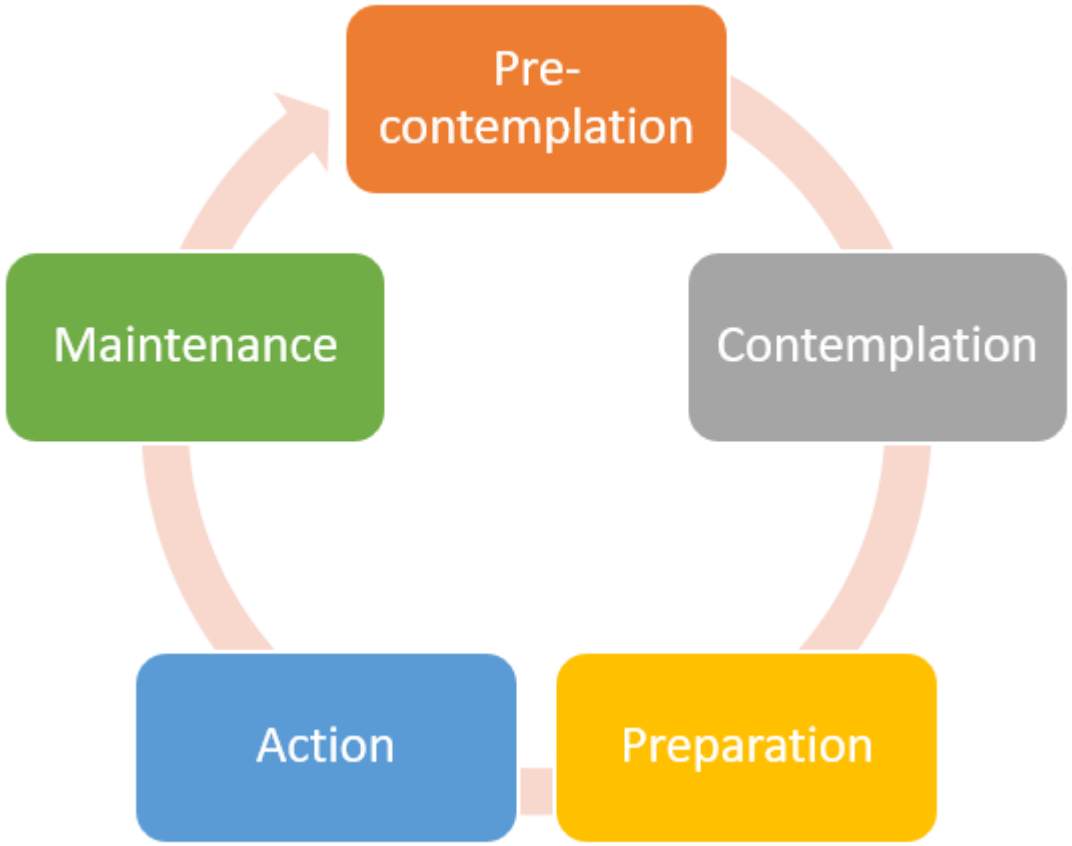
Behaviour is Complex



Behaviour ≠ *Behaviour Change*

Trans-Theoretical Model (TTM)

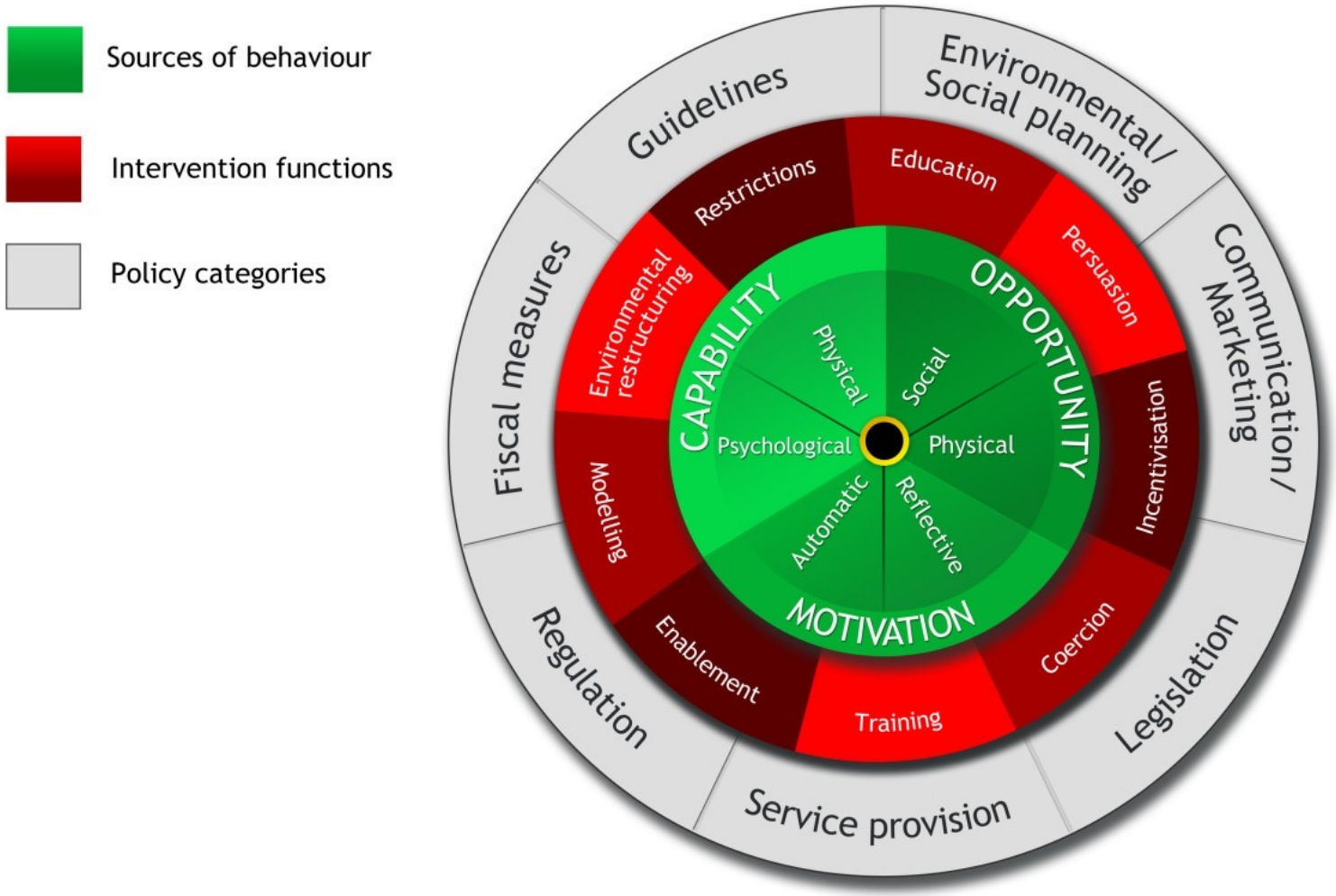




Source: Jennamag

Prochaska, J.O. and DiClemente, C.C. (1984). The transtheoretical approach: Crossing the traditional boundaries of therapy. Melbourne, Florida: Krieger Publishing Company

Behaviour Change Wheel

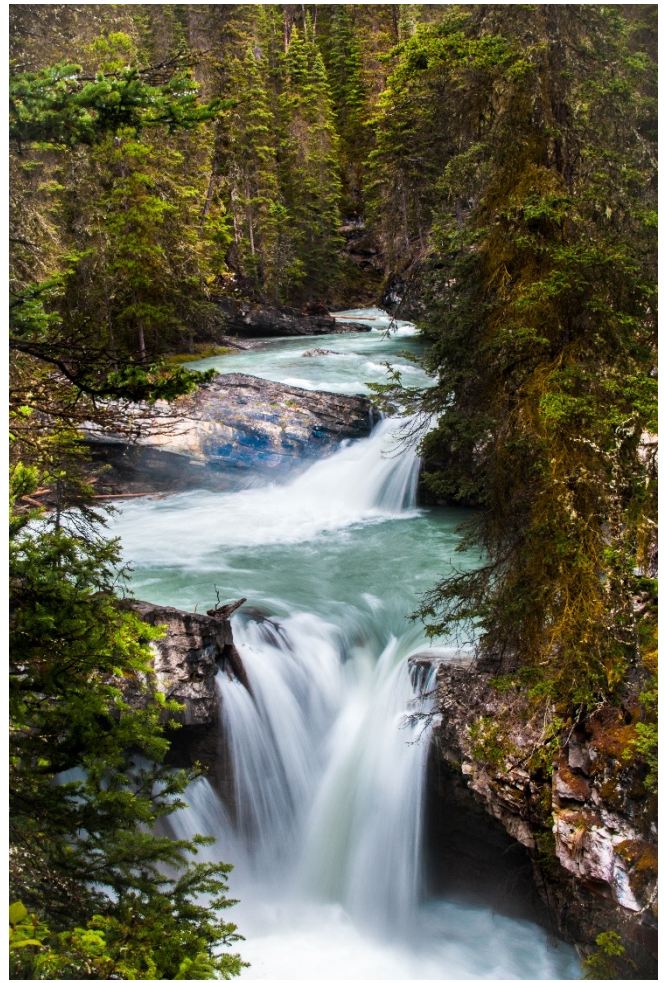


Michie, S., Van Stralen, M. M., & West, R. (2011). The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implementation science*, *6*(1), 1-12.

Behaviour Change Interventions

- **Downstream – influencing individuals' choice**
  - information provision/advertising/signage
  - modelling (social learning) and norm-based approaches

- **Upstream – influencing context/situation to support action (changing trade-off of choices)**
  - economic measures
  - education (and changing cultural norms)
  - changes to available products, services, and behavioural options
  - changes to infrastructure / (built) environment



McKinlay, J.B. (1993). The Promotion of Health Through Planned Socio-Political Change: Challenges for Research and Policy. Social Science and Medicine, 36 (2), 109–117; Verplanken, B., & Wood, W. (2006). Interventions to break and create consumer habits. Journal of Public Policy & Marketing, 25(1), 90-103.

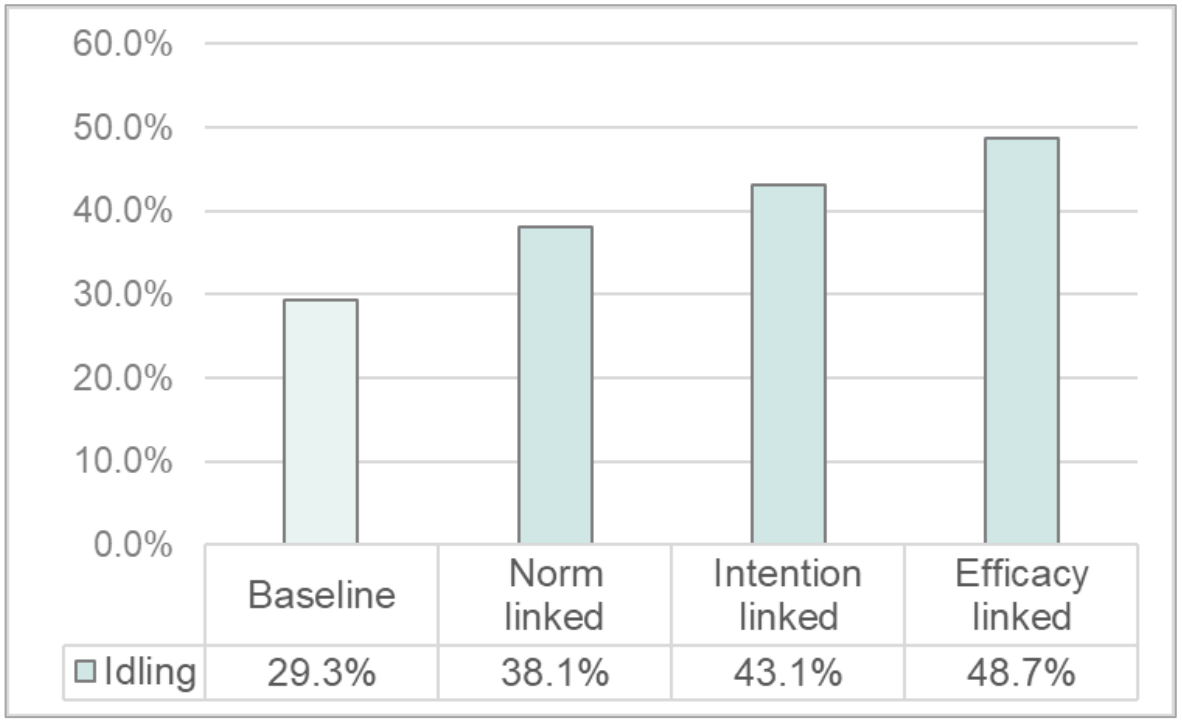
Downstream interventions

Downstream Behaviour Change Interventions

- **Information campaigns can be targeted to different behavioural motivations – e.g. using TPB or VBN**
  - attitudes (costs and benefits)
  - behavioural control (how easy it is to do)
  - social norms (what is normal/expected)
  - values (what you are doing it for)

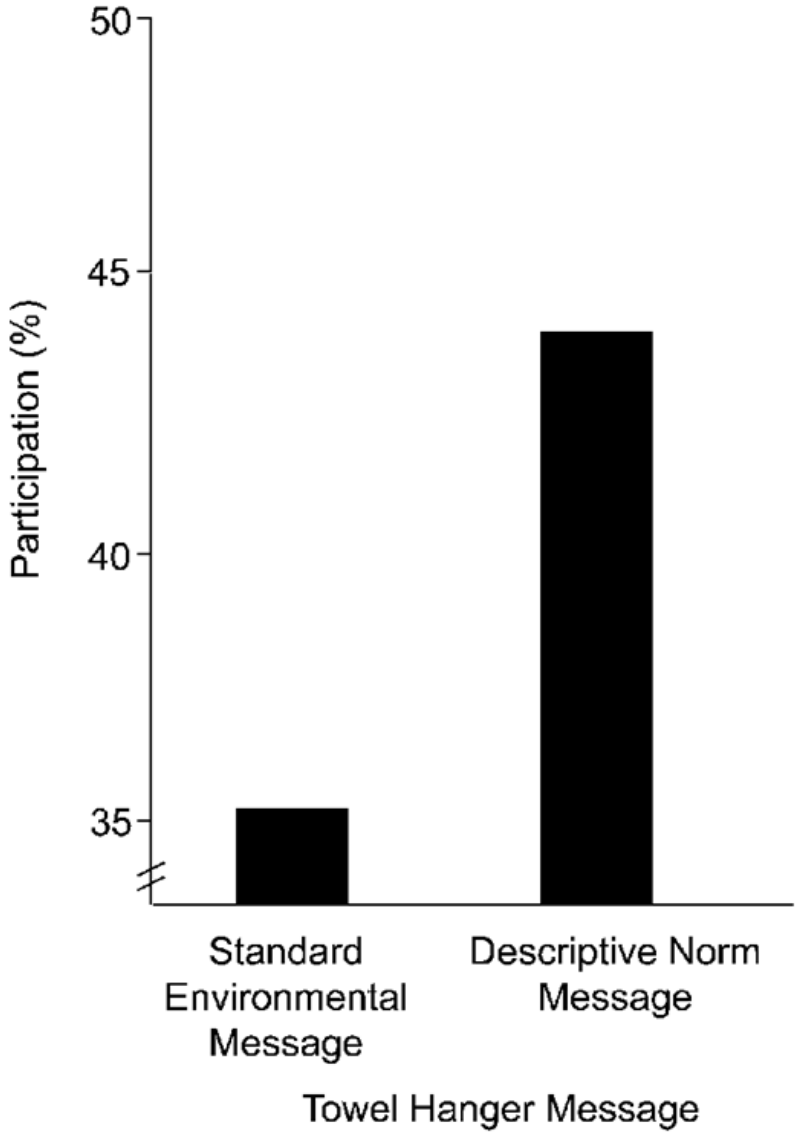
Downstream Behaviour Change Interventions

Type of Message	Text
Efficacy linked	Please switch off your engine… You will improve air quality in this area
Norm linked	When barriers are down, turn down your engine to show others you care
Intention linked	When barriers are down do you intend to turn off your engine?
Baseline/Control	[no message]



Mahmood, L., et al (2019). Intentions, efficacy, and norms: The impact of different self-regulatory cues on reducing engine idling at long wait stops. Journal of Environmental Psychology, 66, 101368.

Downstream Behaviour Change Interventions

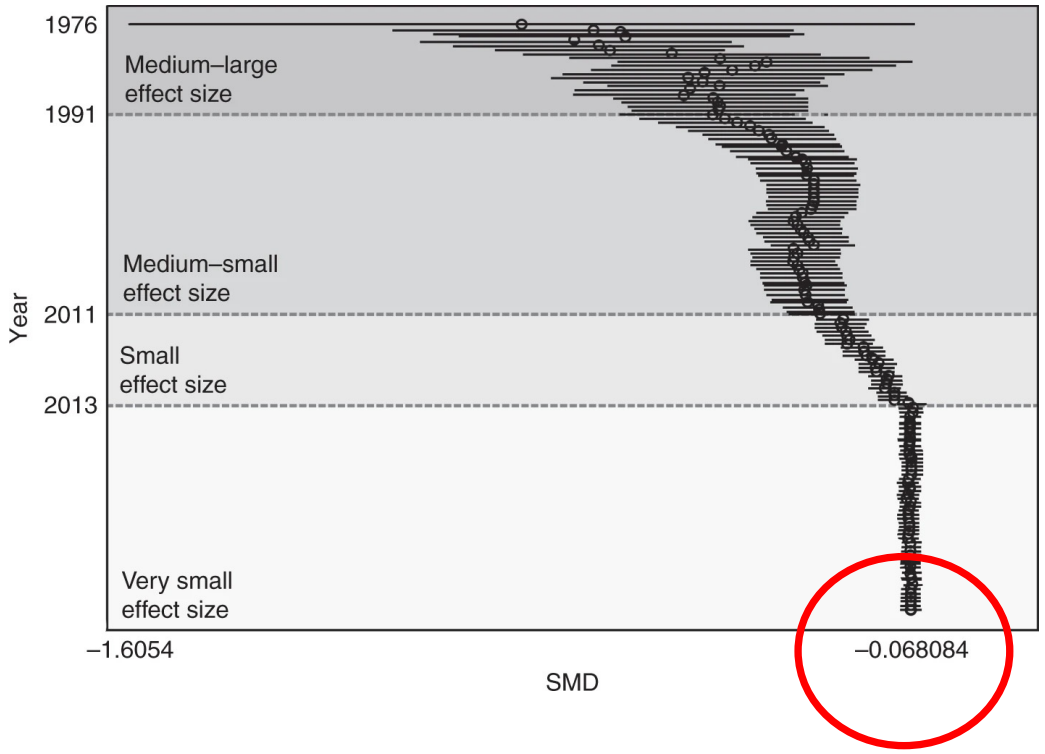


"the majority of guests [in this room] reuse their towels"

Goldstein, N. J., Cialdini, R. B., & Griskevicius, V. (2008). A room with a viewpoint: Using social norms to motivate environmental conservation in hotels. Journal of consumer Research, 35(3), 472-482.

Downstream Behaviour Change Interventions

- **Nisa et al (2019) systematic review of randomised controlled trials (RCTs)**
  - focus on household actions to tackle climate change
    - energy use
    - travel & transport
    - consumption of animal products (meat)
    - food waste
    - recycling
  - meta-analysis of 83 behaviour-change RCTs, with 3,000,000+ observations
  - **strict inclusion criteria**: experimental, 'controlled', and real-world, 'measures of (f)actual' behaviour
  - economic (dis)incentives & regulations excluded



Nisa, C. F., Bélanger, J. J., Schumpe, B. M., & Faller, D. G. (2019). Meta-analysis of randomised controlled trials testing behavioural interventions to promote household action on climate change. Nature communications, 10(1), 1-13.

Downstream Behaviour Change Interventions

- **Nisa et al (2019): Conclusions**
  - behavioural interventions have only (very) small effects
    - no evidence of effects beyond intervention
  - information provision does not work
  - nudges show the biggest effects
  - commitment, appeals and 'goal setting' may be effective – but self-selected samples
  - important high-impact behaviours (e.g. buying energy efficient appliances / car use) "barely affected"
  - recycling – and to some extent food waste and meat consumption – more amenable to change
  - behavioural interventions may be more effective in combination with alternative strategies
    - e.g. financial incentives, infrastructure change, regulation

Table 1 Effect sizes per key moderators

Moderator		*k*	*N*	Effect size *d* (CI)	I^2 (%)	POB (%)
Overall effect size		144	3,092,678	−0.093 (−0.160, −0.055)	64.6**	6.6
Sensitivity analysis						
Sample type	Households	66	724,792	−0.112 (−0.221, −0.057)	73.1**	
	Individuals	78	2,367,886	−0.118 (−0.221, −0.060)	51.9**	
Sample size per condition	≤100	82	5709	−0.335 (−−0.555, −0.190)	49.9**	
	]100, 500[	45	22,840	−0.141 (−0.280, −0.063)	51.4**	
	≥500	17	3,074,121	−0.028 (−0.106, −0.006)	25.6	
Self-selection	Self-selected	79	12,550	−0.279 (−0.465, −0.161)	60.3**	
	Naïve	65	3,080,128	−0.040 (−0.103, −0.016)	53.6**	
Region	Europe	43	2,333,441	−0.210 (−0.446, −0.093)	58.6**	
	US/Canada	78	750,854	−0.108 (−0.208, −0.054)	72.7**	
	Rest World	23	8383	−0.059 (−0.407, −0.013)	0	
Behaviour[a]						
Energy		47	719,059	−0.094 (−0.133, −0.055)	67.7**	6.6
	Appliances	12	108,077	−0.036 (−0.129, 0.058)	22.6	2.5
Transportation		29	2,245,972	−0.136 (−0.183, −0.089)	98.4**	9.6
	Car use	21	2,242,781	−0.036 (−0.039, −0.034)	0	2.5
Water		42	124,082	−0.052 (−0.079, −0.025)	40.1**	3.7
	Towel	18	8909	−0.168 (−0.271, −0.064)	47.8**	11.9
Food waste		4	218	−0.231 (−0.518, 0.056)	21.6	16.3
Meat		7	666	−0.239 (−2.81, 0.008)	36.8	16.9
Recycling		23	2766	−0.457 (−0.595, −0.319)	69.9**	32.3
Intervention						
Information		53	2,354,243	−0.048 (−0.075, −0.021)	34.7**	3.4
Social comparison		32	719,756	−0.077 (−0.108, −0.046)	72.2**	5.4
Engagement		38	10,486	−0.253 (−0.336, −0.170)	71.8**	17.9
	Commitment	10	1446	−0.480 (−0.704, −0.255)	75.8**	33.9
Appeals		10	5952	−0.266 (−0.445, −0.086)	70.5**	18.8
Nudges		11	795	−0.352 (−0.492, −0.212)	0	24.9

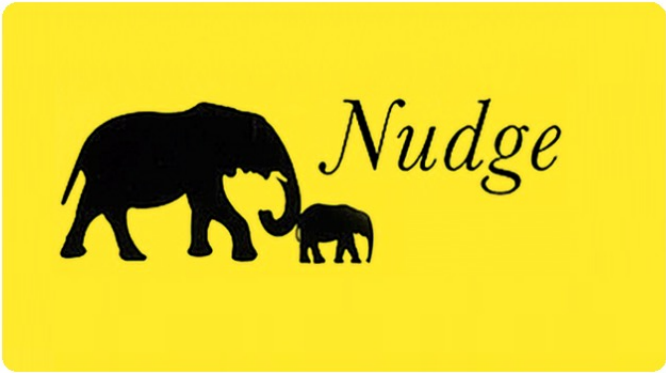
Note: *k* = #estimates; *N* = sample size; I^2 = Heterogeneity; POB = probability of benefit (effect size $d/\sqrt{2}$)
**$p < 0.05$
[a]The total aggregate sample size per analysis of behaviour is 3,092,763—an additional 85 individuals than the overall 3,092,678. This difference is due to a single study (Kurz et al. 2005 in Supplementary References) testing the effect of an intervention in both water and energy and, thus, its sample (*N* = 85) was accounted in both behaviours

Nisa, C. F., Bélanger, J. J., Schumpe, B. M., & Faller, D. G. (2019). Meta-analysis of randomised controlled trials testing behavioural interventions to promote household action on climate change. Nature communications, 10(1), 1-13.

Upstream interventions

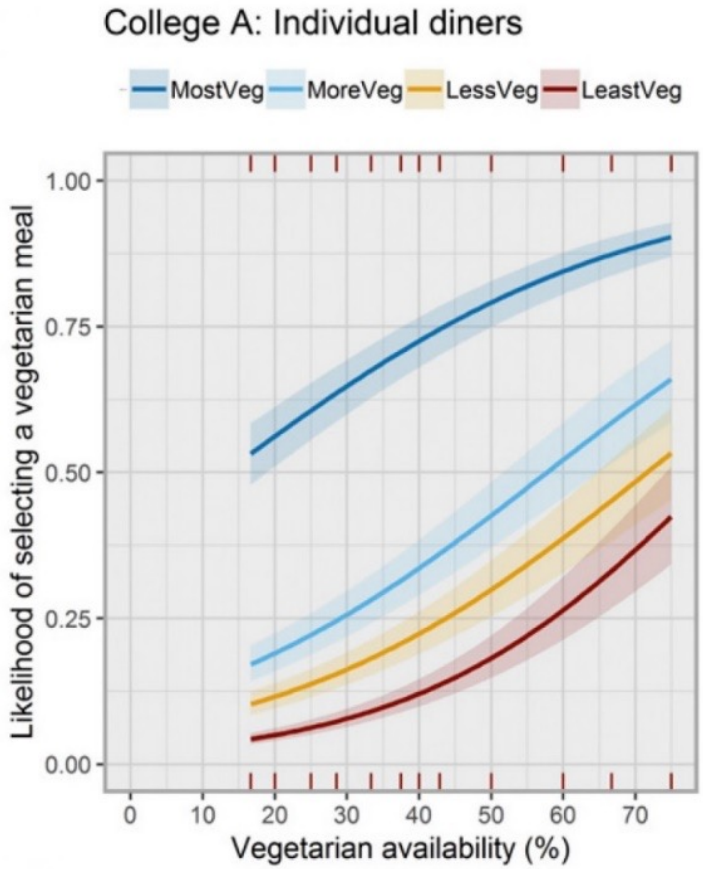
Upstream Behaviour Change Interventions

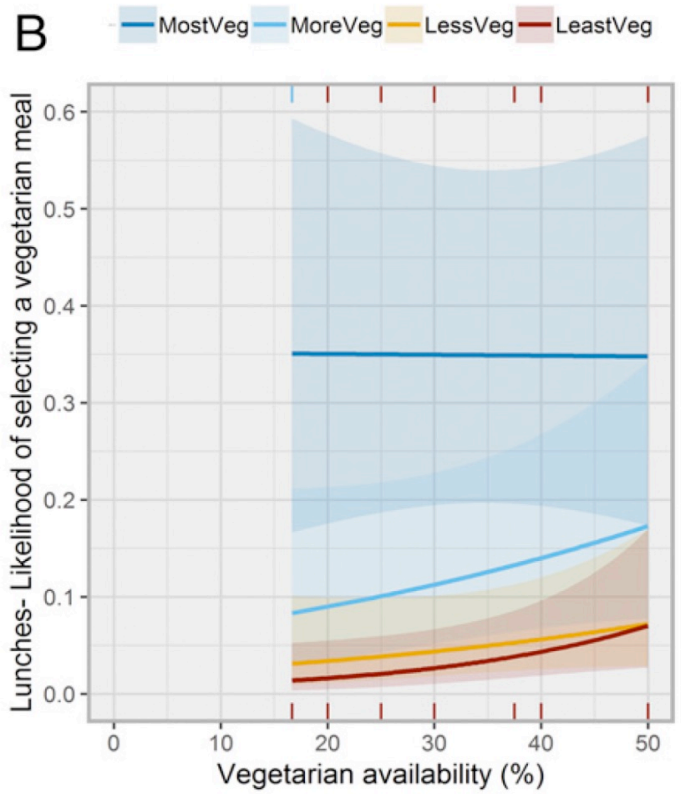
- **Structural and cultural change - i.e. changing context and/or behavioural options (upstream Interventions)**
  - investment in infrastructure – e.g. recycling collection, ‘binfrastructure’, cycle paths
  - regulation and legislation – e.g. carrier bag ban or charge
  - nudging (choice architecture / change the default)



Upstream Behaviour Change Interventions

- **Effectiveness of increasing availability of vegetarian meals**
  - year-long intervention using anonymised data from 94,644 meal purchases
  - three college cafeterias at an English University





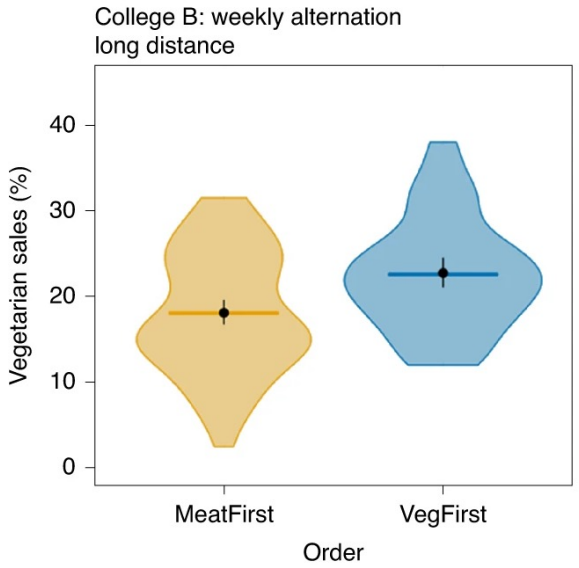
Garnett, E. E., Balmford, A., Sandbrook, C., Pilling, M. A., & Marteau, T. M. (2019). Impact of increasing vegetarian availability on meal selection and sales in cafeterias. Proceedings of the National Academy of Sciences, 116(42), 20923-20929.

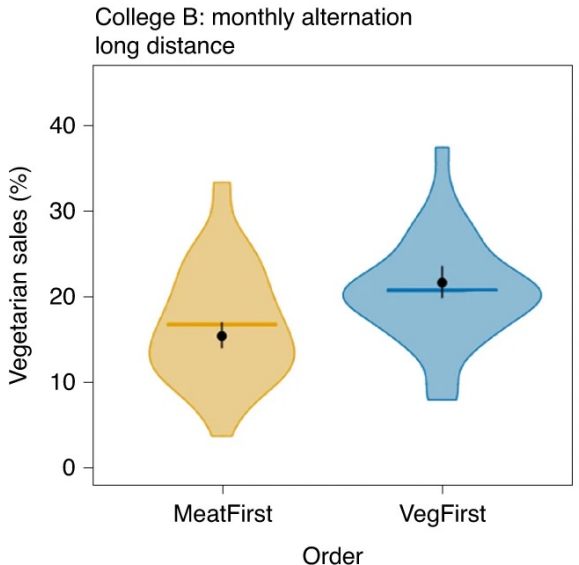
Upstream Behaviour Change Interventions

- **Nudging: placing vegetarian meal first**
  - choice architecture: making the vegetarian option the default
  - two-year experiment using data from 105,143 purchases
  - two college cafeterias at an English University

  - multiple ‘treatments’ systematically altering
    - order of food options (‘meat first’ or ‘veg first’)
    - frequency of changing options (weekly or monthly)
    - distance between options (< 1 meter or > 1.5 meters)

  - placing vegetarian options first increased their sales when options were widely separated





Garnett, E. E., Marteau, T. M., Sandbrook, C., Pilling, M. A., & Balmford, A. (2020). Order of meals at the counter and distance between options affect stude cafeteria vegetarian sales. Nature Food, 1(8), 485-488.

Upstream Behaviour Change Interventions

- **The importance of a supporting infrastructure**
  - Bogotá, Colombia, has successfully raised levels of cycling through Cicloviá (cycleway) network
  - Cervero et al (2009) find that reserved lanes, street designs, route connectivity important
  - Bruntlett and Bruntlett (2018):

"the Dutch cycle because they've built a… network of fully separated bike infrastructure…"

- **Pucher et al (2010): systematic review of 14 case studies**
  - large increases in cycling can be establish by comprehensive interventions that combine (1) *infrastructure improvements*, (2) *educational campaigns*, and (3) *restrictions on car use*

Cervero, R. et al. (2009). Influences of built environments on walking and cycling: lessons from Bogotá. International Journal of Sustainable Transportation, 3(4), 203-226; Bruntlett, M., & Bruntlett, C. (2018). Building the cycling city: the Dutch blueprint for urban vitality. Island Press; Pucher, J. et al. (2010). Infrastructure, programs, and policies to increase bicycling: an international review. Preventive Medicine, 50, S106-S125.

Upstream Behaviour Change Interventions

“But we are not #Amsterdam!’…”

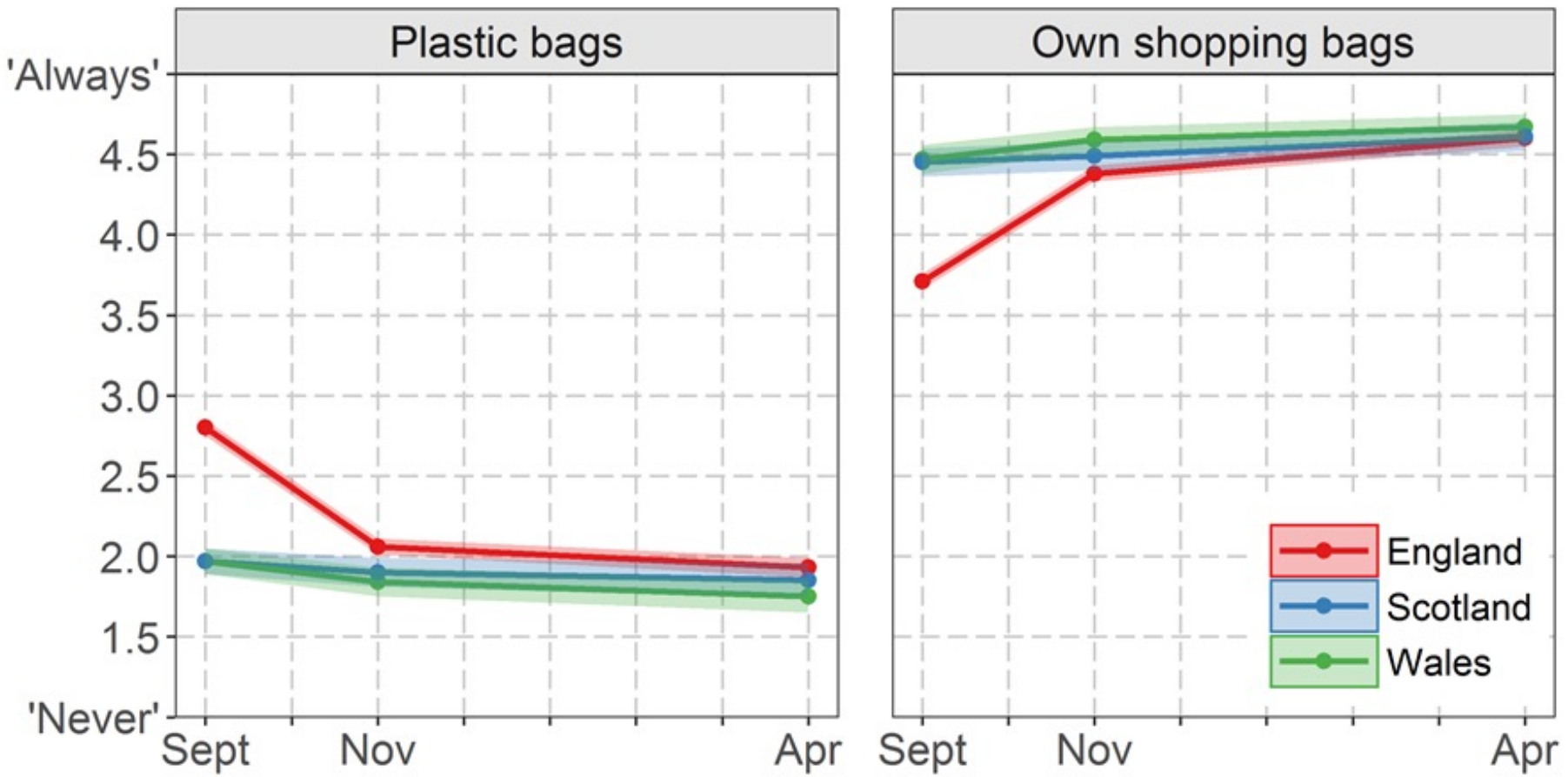
1978

2015

https://twitter.com/fietsprofessor/status/1371464179996053507

Upstream Behaviour Change Interventions

Upstream Behaviour Change Interventions



Thomas, G. O. et al. (2019). The English plastic bag charge changed behavior and increased support for other charges to reduce plastic waste. *Frontiers in Psychology*, *10*, 266.

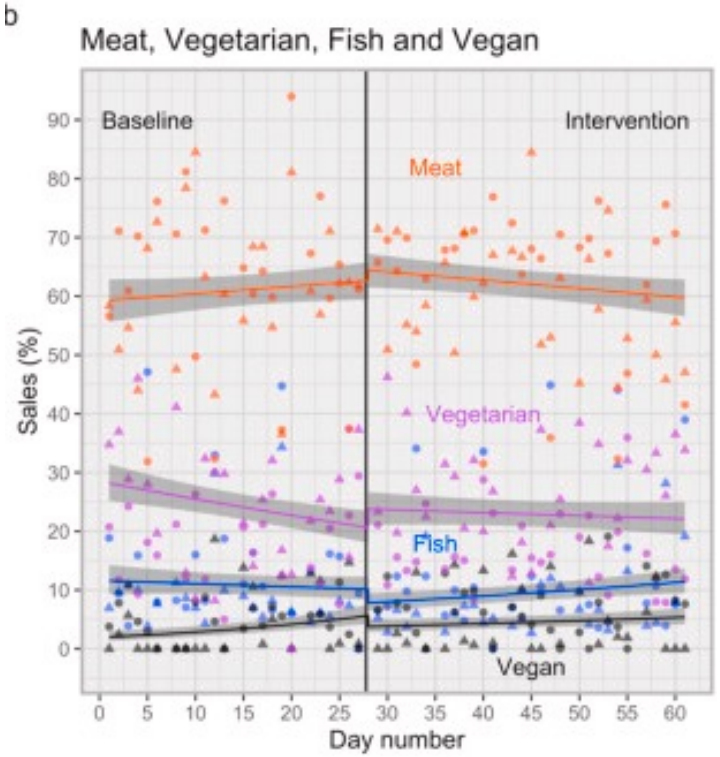
Upstream Behaviour Change Interventions

- **Field experiment to see if easily implementable measures can increase reusable cup use**
  - posters/showcards on environmental impacts
  - selling reusable cups at (about) cost price
  - distributing reusable cups for free to customers
  - reward for using a reusable cup (i.e. 15-25p discount)
  - penalty for using disposable cup (i.e. 25p charge)
- **Bewley's recruited 12 university/business sites**
  - recording sales 5 weeks before and 5 weeks after
- **Financial incentives with other measures are effective – in both short and long term.**
  - but… while a charge is effective, a discount is not

Poortinga, W., & Whitaker, L. (2018). Promoting the use of reusable coffee cups through environmental messaging, the provision of alternatives and financial incentives. *Sustainability*, *10*(3), 873.

Upstream Behaviour Change Interventions

- **Do (small) charges always change behaviour?**
  - field study (Autumn 2018) at University of Cambridge
  - anonymised meal selections (n= 13,840) over 9 weeks
  - intervention in week 5
    - vegetarian: £0.20 cheaper
    - meat: £0.20 more expensive
  - no significant change in meal selection
  - intervention only significantly affected the quartile of diners with the highest prior rates of vegetarian and vegan meal selection

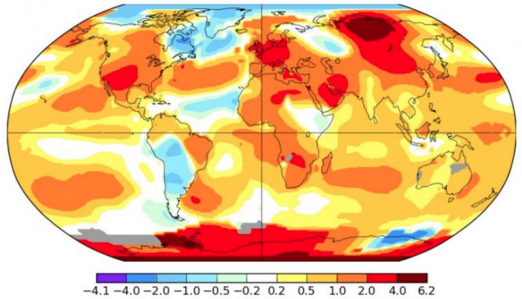


- **If charge is absorbed in price then it becomes invisible**
  - (in contrast to explicit charges – carrier bag/congestion charge)

Garnett, E. E., Balmford, A., Marteau, T. M., Pilling, M. A., & Sandbrook, C. (2021). Price of change: Does a small alteration to the price of meat and vegetarian options affect their sales?. Journal of Environmental Psychology, 75, 101589.

What does this all tell us?

- Changing behaviour is HARD… VERY hard…
- Psychological approaches can be useful, but…
- Some interventions more effective than others
  - just providing information often does not work
  - signage/nudging work in specific circumstances – but need to get timing right (e.g. when decisions made/habits are disrupted)



- Interventions more effective in combination with measures that involve a change in wider context
- Good in changing specific behaviours, but more fundamental changes (transformations!) are need to get to net zero
- Significant lifestyle changes are, however, only possible if they occur within broader system change (Akenji et al 2021)

Akenji, L., Bengtsson, M., Toivio, V., Lettenmeier, M., Fawcett, T., Parag, Y., Saheb, Y., Coote,A., Spangenberg, J. H., Capstick, S., Gore, T., Coscieme, L., Wackernagel, M., & Kenner, D. (2021). 1.5-Degree Lifestyles: Towards A Fair Consumption Space for All. Berlin: Hot or Cool Institute.

Diolch yn Fawr!

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