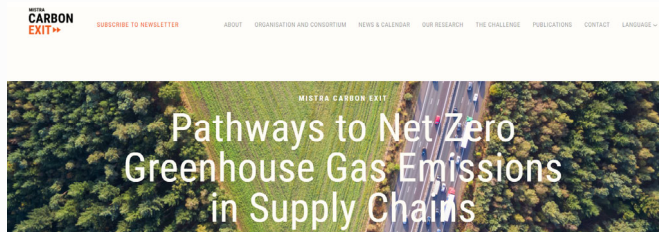




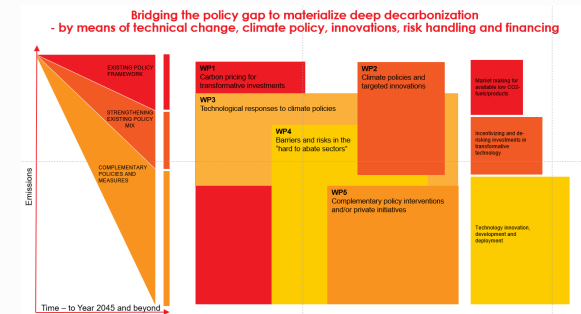
UNIVERSITY OF GOTHENBURG  
SCHOOL OF BUSINESS, ECONOMICS AND LAW

# BEHAVIORAL ECONOMICS IN ACTION: CLIMATE CHANGE



Centre for Collective Action Research

The Centre for Collective Action Research, CeCAR, focuses on one of the most pressing challenges of today: Large-Scale Collective Action, LSCA. This is a challenge that



ÅSA LÖFGREN





## The climate change domain

- Behavioural interventions implemented with the purpose of reducing greenhouse gas emissions can be seen as behavioural solutions to a conventional economic problem (negative externalities)
- Which household and individual behaviours are relevant within this domain?

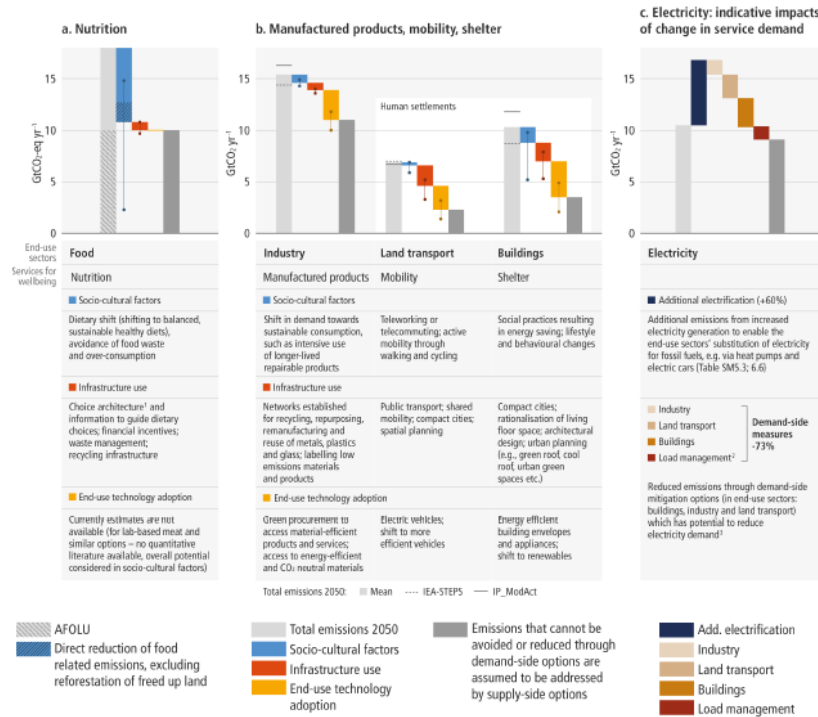
# Behaviours with significant climate impact

## *Individuals and households*

- Energy consumption related to housing (heating, cooling, appliance use)
- Transportation (aviation, gasoline, and diesel consumption)
- Consumption of meat and dairy products
- Food waste
- Water usage (shower, dishes, washing)
- Recycling
- Clothing/fashion consumption



Demand-side mitigation can be achieved through changes in socio-cultural factors, infrastructure design and use, and end-use technology adoption by 2050.



<sup>1</sup>The presentation of choices to consumers, and the impact of that presentation on consumer decision-making.  
<sup>2</sup>Load management refers to demand-side flexibility that cuts across all sectors and can be achieved through incentive design like time of use pricing/monitoring by artificial intelligence, diversification of storage facilities, etc.  
<sup>3</sup>The impact of demand-side mitigation on electricity sector emissions depends on the baseline carbon intensity of electricity supply, which is scenario dependent.

## IPCC AR6 assess demand-side mitigation options for the first time

- Potential to bring down global emissions by 40-70% by 2050, walking, cycling, electrified transport, reduced air travel, and adapting houses can make large contributions. Lifestyle changes.
- Socio-cultural factors, Infrastructure use, End-use technology adoption

# The effect of behavioral interventions within the climate change domain

- Nisa et al. 2019 *Nature communications* Meta-analysis of randomized controlled trials – aim to isolate the effects of specific interventions individually. Small effects on households' action affecting GHG emissions, with no effect over time. Nudges largest effects. Several “Matters Arising” published as comments.
- Carlsson et. al 2021, *REEP* Review of empirical field studies that test green nudges. Observed effects vary greatly, nudges on the extensive margin larger and more permanent effects than those targeting the extent of the action, few studies on long-run effects (but evidence on moral nudges suggest the effect decrease over time)

Interventions: *information, appeals* (requests, pleas and appeals), *engagement* (e.g. goalsetting), *social comparison, choice architecture/nudges* (removing external barriers or increasing access)

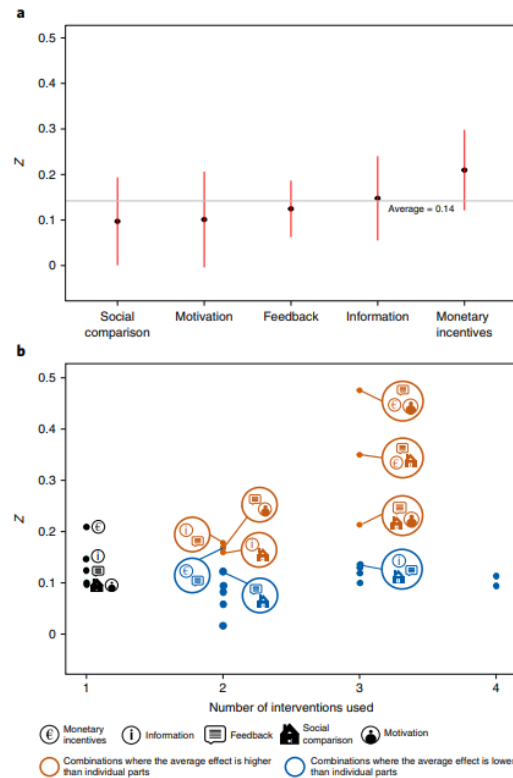
Interventions: *defaults, provision and simplification of information, changes to the physical environment, reminders, social comparisons, moral suasion, goal setting and commitments*

Some caution: overestimated effects as compared to the results from nudge units to a large part depending on publication bias (DellaVigna and Linos, 2022, *Econometrica* RCTS to scale: comprehensive evidence from two nudge units) Publication bias effects are also found in Mertens et. al, 2021, *PNAS*, “The effectiveness of nudging: A meta-analysis of choice architecture interventions across behavioral domains”.

# Household energy consumption and (behavioral) interventions

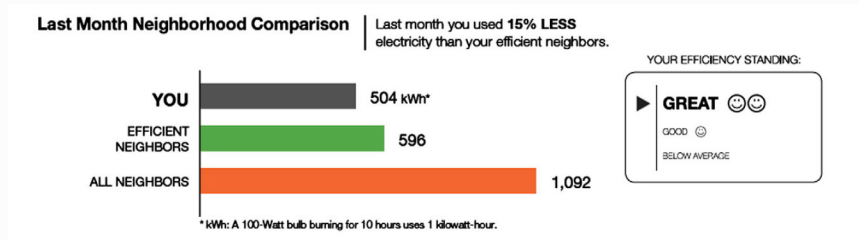
Khanna et. al 2021, Nature Energy

- Meta-analysis of the effectiveness of interventions in household energy consumption. 122 primary studies resulting in 360 effect sizes representing 1.1 million households in 25 countries.
- Monetary incentives have the highest average effect size, while motivation and social comparison have a lower average effect size.
- Estimated (first attempt) global carbon emission reduction potential from behavioural interventions corresponding to 6% of emissions from residential buildings and 1% of total global emissions
- Relative effects of interventions may vary with context, the authors caution when comparison between average effect sizes of different interventions is interpreted.
- The findings support the idea that interventions should not be studied individually but rather as synergistic packages to increase effectiveness.

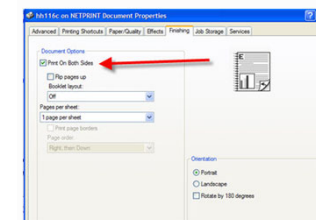


**Fig. 2 | Estimated average effect size of different categories of reviewed interventions.** **a.** The average effect size for individual interventions along with the corresponding 95% confidence interval. **b.** The average effect size for combinations of interventions. Only combinations with an average effect size that is statistically significant at the 5% level of significance are labelled.  $Z > 0$  implies a reduction in energy consumption. The results are from a multilevel meta-regression model with interacted dummy variables for the five interventions. Only studies that employed randomization are included.

- Effect sizes varies with context and choice situations
- Can theory help us say something more general about which type of choices that are more likely to be affected by behavioural interventions?  
Nordblom and Löfgren, 2020, JEBO, “A theoretical framework of decision making explaining the mechanisms of nudging”



Specific Commitment



## The decision-making process: Attentive versus inattentive choices

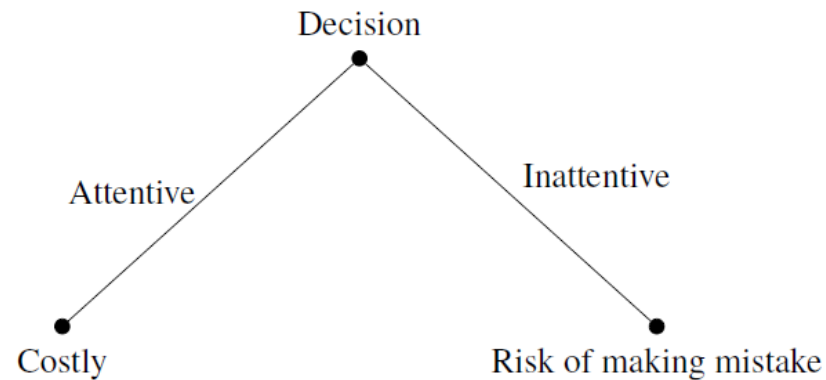


Figure 1: Decision-making process

- Individuals willingness to “invest” (accept the cognitive cost) in making an attentive choice likely depends on the choice itself
- We argue that individuals are nudgeable only when they make (limited) inattentive or intuitive choices

Nordblom and Löfgren, 2020, JEBO, “A theoretical framework of decision making explaining the mechanisms of nudging”



## The model

Three components together determine whether the individual makes an attentive (rational) or inattentive choice:

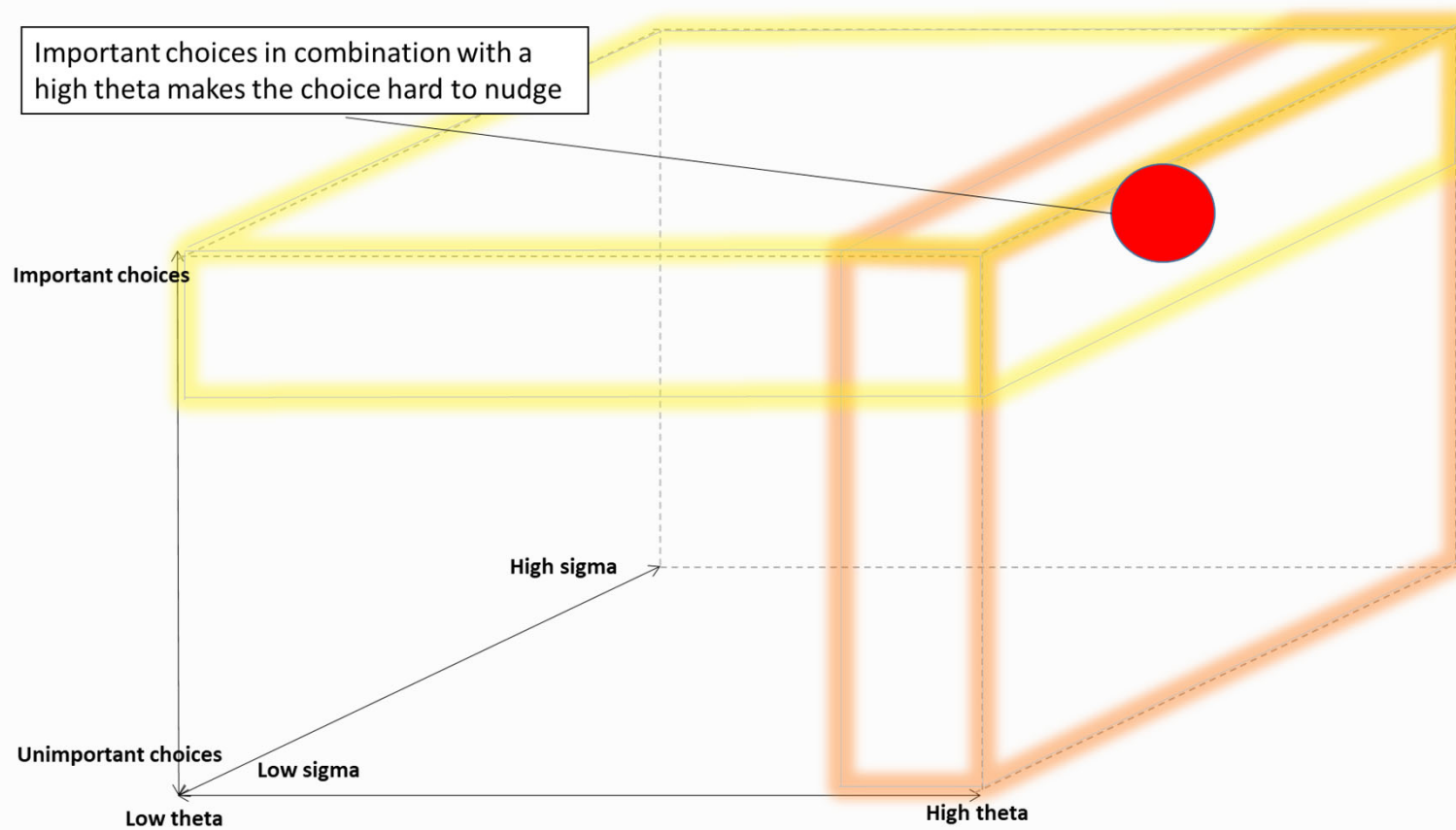
*EFFORT* ( $\zeta$ ), *CONFIDENCE* ( $1-\theta$ ), AND *IMPORTANCE* ( $E[\Delta U]$ )

Ceteris paribus:

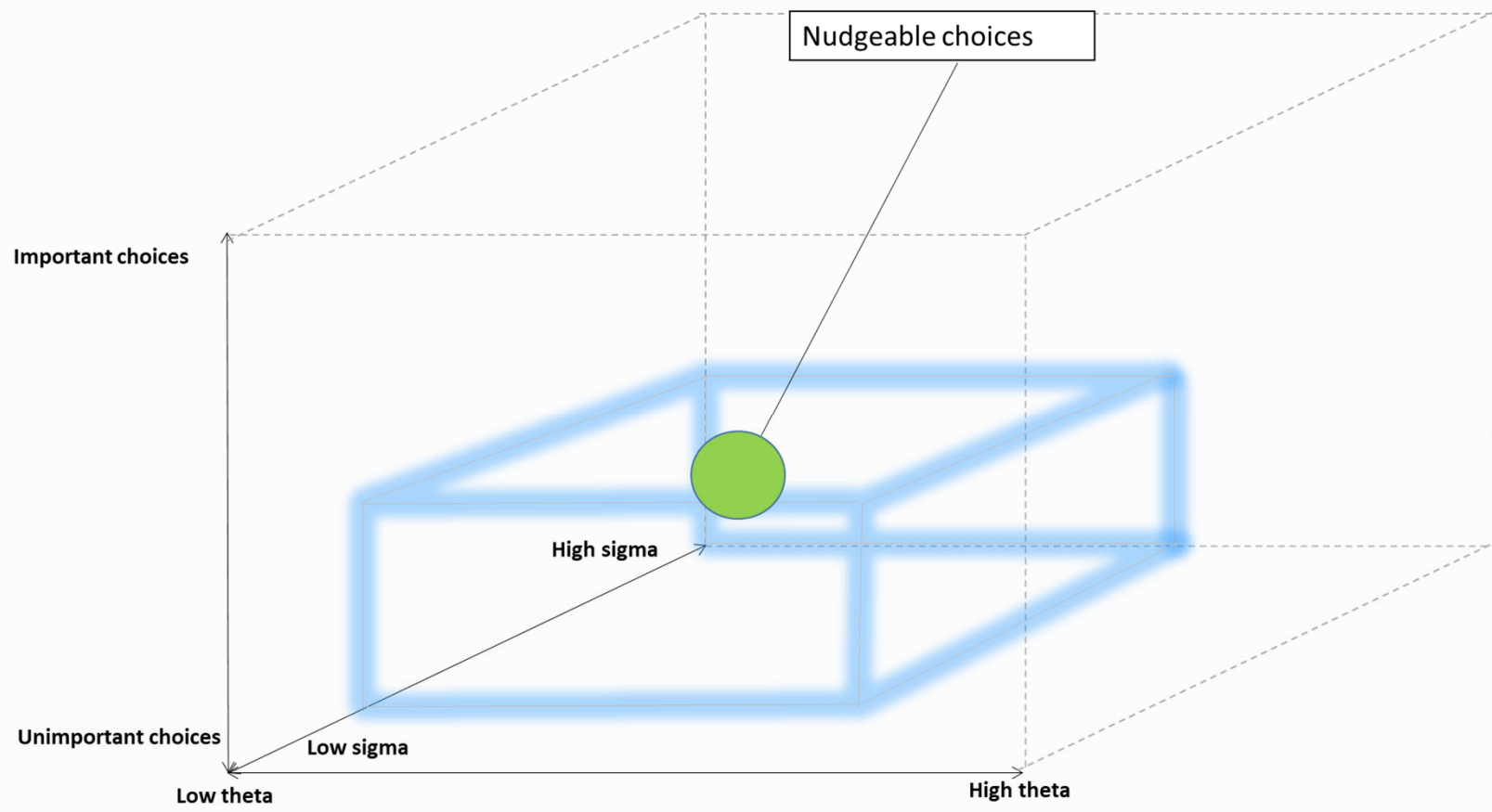
- A higher effort ( $\zeta$ ) makes an attentive choice less likely
- A lower subjective probability ( $1-\theta$ ), of making a mistake in the inattentive choice, the more likely is an inattentive choice
- If the choice is considered to be unimportant (the expected utility consequence of making a mistake is small), the probability is higher that the choice will be inattentive. This is captured by the expected difference in utilities, denoted  $E[\Delta U]$

Nordblom and Löfgren, 2020, JEBO, "A theoretical framework of decision making explaining the mechanisms of nudging"

# Illustrations of nudgeability based on the model



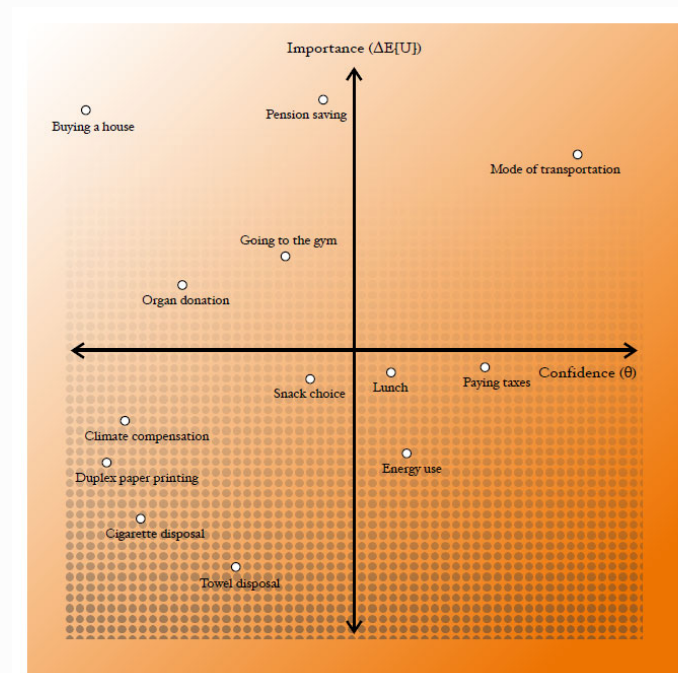
Nordblom and Löfgren, 2020, JEBO, "A theoretical framework of decision making explaining the mechanisms of nudging"



Nordblom and Löfgren, 2020, JEBO, "A theoretical framework of decision making explaining the mechanisms of nudging"

# Policy implications from the model

- Nudging is likely to be effective in choice situations unimportant to the individual: (e.g. towel reuse, duplex printing, snack choice, and what to have for lunch) or difficult choices (e.g. financial decisions).
- Nudging choices involving strong habits or choices that are judged important by the individual are less likely to be effective.
- Note: a specific intervention could be a nudge to some individuals but not to others.



Nordblom and Löfgren, 2020, JEBO, "A theoretical framework of decision making explaining the mechanisms of nudging"

# Concluding remarks



- Reflection: Which role can behavioral interventions and insights play to drive societal-wide greenhouse gas emission reductions?
- Take-home messages:
  1. Behavioural interventions in the climate change domain have been shown to have significant (but in many cases small) effects but the effect size is dependent on choice context and type of intervention
  2. There seem to be an important potential for behavioral interventions as part of policy packages (and behavioural insights when designing policies)
  3. Nudges targeting choices involving strong habits or choices that are judged important by the individual are unlikely to be effective
  4. Behavioral interventions can not replace pricing- and regulatory policies if we are serious about limiting warming to 1.5 or 2 degrees (global GHG emissions need to peak before 2025!)

**THANK YOU!**

