

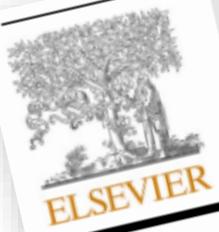
# Psykologiska barriärer för hållbara dieter

Noah Linder, postdoc på KVA  
PLATE/ReSus-projektet



GLOBAL ECONOMIC DYNAMICS  
AND THE BIOSPHERE

THE ROYAL SWEDISH ACADEMY OF SCIENCES



Contents lists available at ScienceDirect

# Food Quality and Preference

journal homepage: [www.elsevier.com/locate/foodqual](http://www.elsevier.com/locate/foodqual)



## Psychological barriers for sustainable diets: Unpacking intention-behavior gaps in meat consumption

Noah Linder<sup>a,b,c,\*</sup>, Therese Lindahl<sup>c,b</sup>, Nanda Wijermans<sup>b,d</sup>

<sup>a</sup> Global Economic Dynamics and the Biosphere, Royal Swedish Academy of Science, Stockholm, Sweden  
<sup>b</sup> Stockholm Resilience Centre, Stockholm University, Stockholm, Sweden  
<sup>c</sup> Beijer Institute of Ecological Economics, Royal Swedish Academy of Sciences, Stockholm, Sweden  
<sup>d</sup> The Institute for Future Studies, Stockholm, Sweden

### ARTICLE INFO

Keywords:  
Sustainable food system  
Consumers  
Food choices  
Protein shift  
Habits  
Attitudes

### ABSTRACT

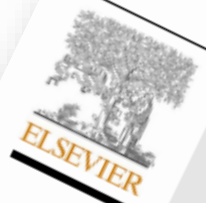
Promoting a shift away from meat consumption towards an increased consumption of plant-based proteins is a promising strategy for addressing environmental challenges while consumers already express a strong interest in adopting more sustainable diets. However, evidence suggests that there is only a weak link between these intentions and actual behavior. This study explores three research questions: 1) How can we reduce meat consumption among meat eaters? 2) How can we increase the adoption of plant-based proteins? 3) How can we reduce the intention-behavior gap? We recruited a nationally representative sample of Swedish consumers, compared to those without such intentions, and investigated what factors drive their continued meat consumption. We also investigated what factors drive their adoption of plant-based proteins ( $\beta = 0.35$ ) both — were the same. We included 14 theoretically informed variables, including individual factors like environmental self-identity, and social factors like social norms. We found that roles as did practical considerations such as taste and price of plant-based foods ( $\beta = 0.09$ ). Furthermore, although there was a significant intention-behavior gap, although the size of the difference between intention and behavior was smaller than the intention-behavior gap. Among the factors that emerged as driving continued meat consumption, these results suggest that price and taste are the most important factors. These results suggest that price and taste are the most important factors.

### ARTICLE INFO

Keywords:  
Acceptability  
Retail-led interventions  
Sustainable diets  
Protein-shift  
Choice architecture  
Choice restrictions  
Social norms  
Price

### 1. Introduction

Transforming food systems to meet sustainability goals, as it comes with the challenge of reducing greenhouse gas emissions, is a global priority. This requires a shift away from animal-based proteins towards more sustainable protein sources. However, consumers' current consumption patterns are largely driven by taste and price, which are not always aligned with sustainability goals. This paper explores the psychological barriers that prevent consumers from adopting more sustainable diets, and how these barriers can be addressed through retail-led interventions. We investigate the intention-behavior gap in meat consumption, and how this gap can be reduced through targeted interventions. We also investigate the factors that drive the adoption of plant-based proteins, and how these factors can be leveraged to promote a shift away from meat consumption. Our findings suggest that price and taste are the most important factors driving meat consumption, and that these factors can be addressed through targeted interventions. We also find that social norms and environmental self-identity are important factors driving the adoption of plant-based proteins. These findings have implications for the design of retail-led interventions that aim to reduce the intention-behavior gap in meat consumption, and to promote a shift away from meat consumption towards more sustainable protein sources.



Food Policy 136 (2025) 102971

Contents lists available at ScienceDirect

# Food Policy

journal homepage: [www.elsevier.com/locate/foodpol](http://www.elsevier.com/locate/foodpol)

## (Un)acceptable protein shift: Consumer attitudes toward retail-led interventions promoting sustainable diets

Noah Linder<sup>a,c,\*</sup>, Magnus Bergquist<sup>b</sup>, Pär Bjälkebring<sup>b</sup>, Malin Jonell<sup>a,c,e</sup>

<sup>a</sup> Global Economic Dynamics and the Biosphere, Royal Swedish Academy of Science, Stockholm, Sweden  
<sup>b</sup> Department of Psychology, University of Gothenburg 413 14 Gothenburg, Sweden  
<sup>c</sup> Stockholm Resilience Centre, Stockholm University, Stockholm, Sweden

### ABSTRACT

Transforming global and local food systems is essential for achieving current sustainability goals. A significant lever for the food sector is promoting a dietary shift away from animal-based proteins towards more sustainable protein sources. However, consumers' current consumption patterns are largely driven by taste and price, which are not always aligned with sustainability goals. This paper explores the psychological barriers that prevent consumers from adopting more sustainable diets, and how these barriers can be addressed through retail-led interventions. We investigate the intention-behavior gap in meat consumption, and how this gap can be reduced through targeted interventions. We also investigate the factors that drive the adoption of plant-based proteins, and how these factors can be leveraged to promote a shift away from meat consumption. Our findings suggest that price and taste are the most important factors driving meat consumption, and that these factors can be addressed through targeted interventions. We also find that social norms and environmental self-identity are important factors driving the adoption of plant-based proteins. These findings have implications for the design of retail-led interventions that aim to reduce the intention-behavior gap in meat consumption, and to promote a shift away from meat consumption towards more sustainable protein sources.





# Welcome to the Research Centre for Resilient Meals

A platform that explores and strengthens the sustainability, competitiveness and preparedness of the food service sector.

## ReSus - Retail for Sustainability Project

Our mission is to leverage the unrealized potential of supermarkets in enabling the shift to sustainable production and consumption of food.

[Learn More](#)



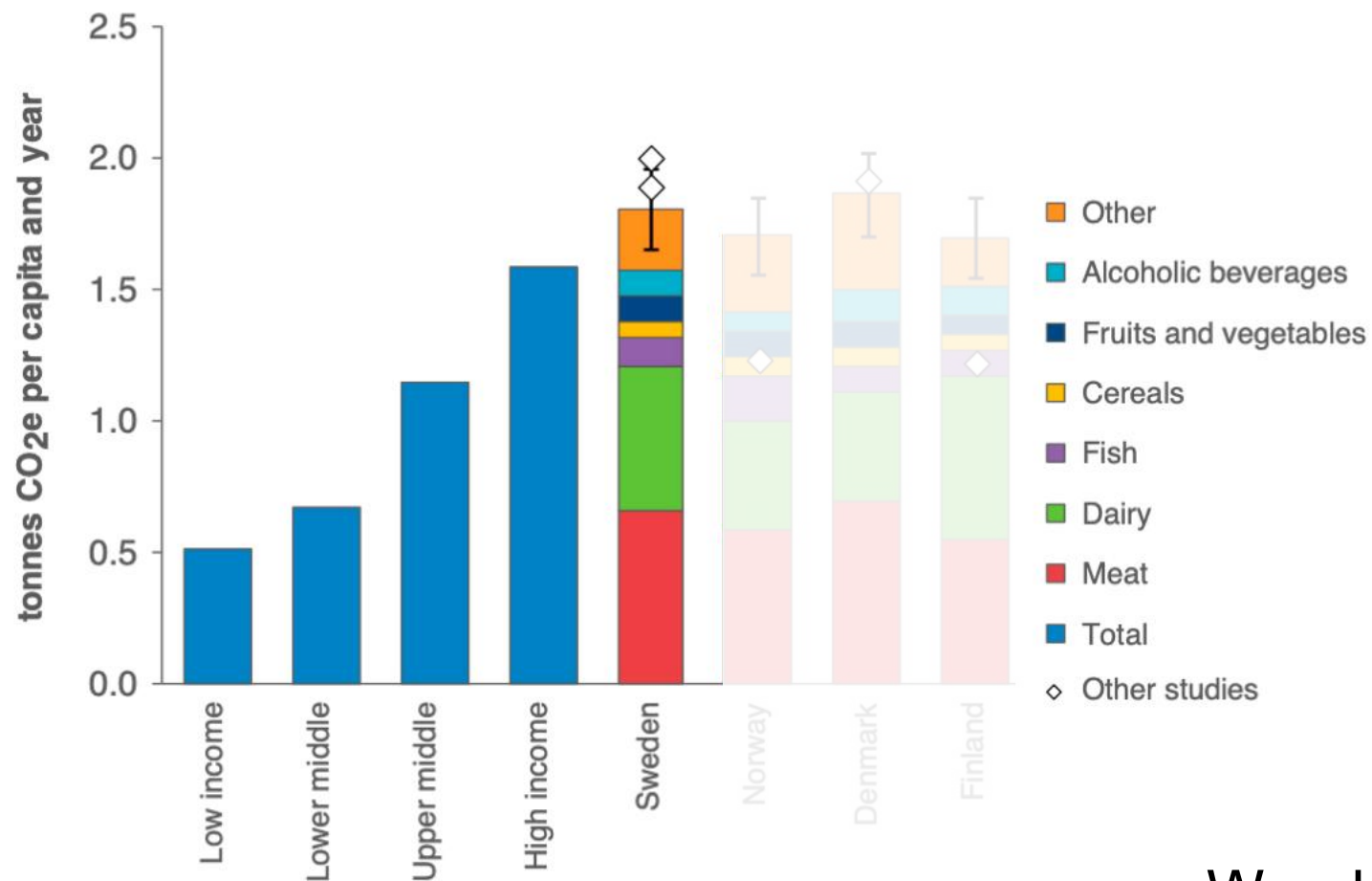
## Livsmedelsproduktion — En stor drivkraft till flera miljöutmaningar

- Klimatutsläpp 25–30 % globalt
- Markanvändning 75 %
- Förlust av biologisk mångfald 75–80 %
- Vattenanvändning 70 %
- Osv.”

*Gordon et al. 2017*



# Klimatpåverkan från genomsnittliga nordiska dieter (per capita)

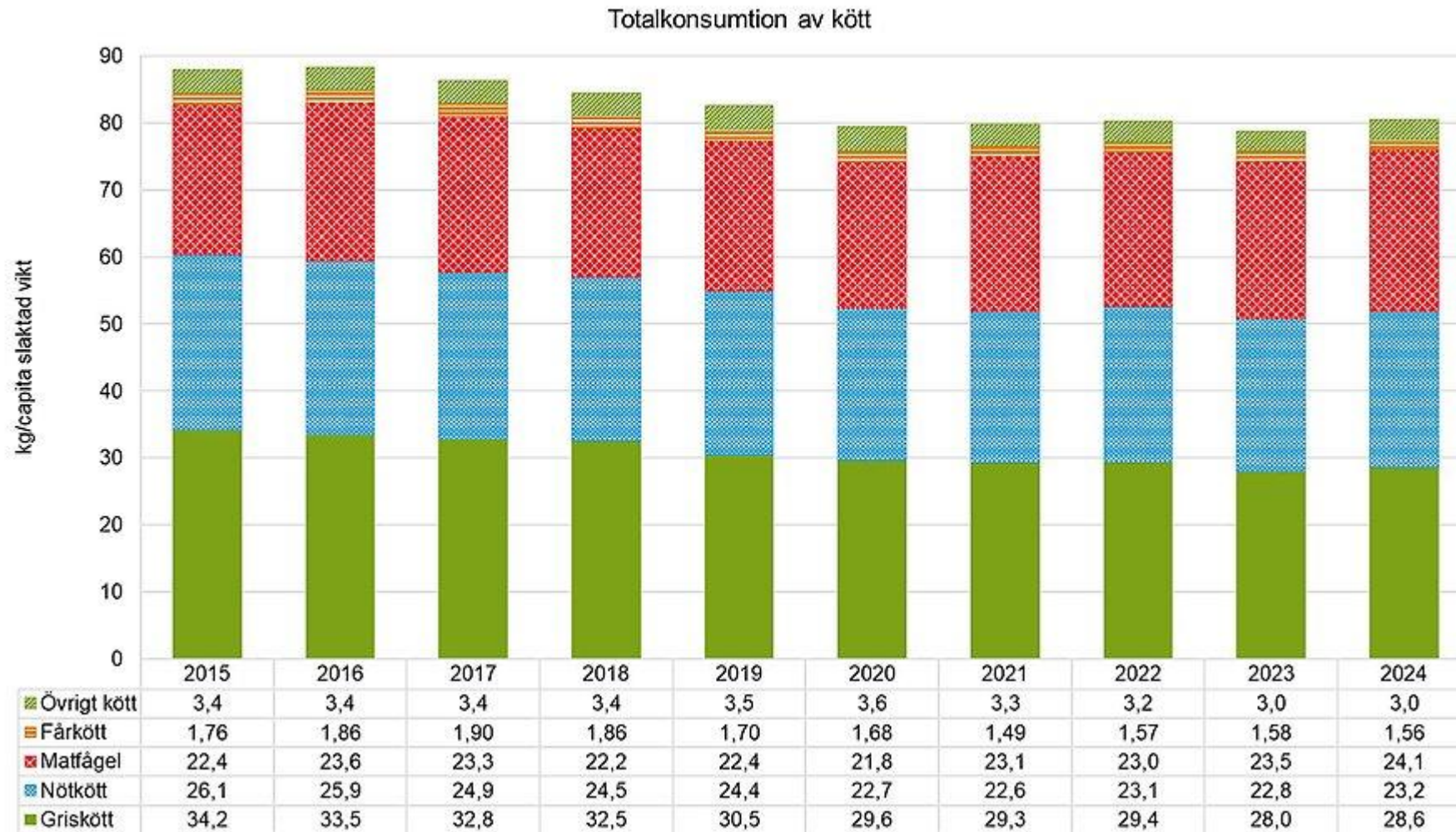


# Hållbara konsumenter – i teorin

- Starkt intresse för hållbara kostvanor
- Hög uttalad intention att minska köttkonsumtionen
- Andelen som äter vegetariskt 2–6 dagar i veckan ökade från 19 % till 30 % på sex år
  - 60 % säger att de äter vegetariskt minst en gång i veckan
- 30 % uppger att de är "flexitarianer" idag
  - Nästan 10 % är vegetarianer



# I praktiken – not so much!





Contents lists available at ScienceDirect

# Food Quality and Preference

journal homepage: [www.elsevier.com/locate/foodqual](http://www.elsevier.com/locate/foodqual)



## Psychological barriers for sustainable diets: Unpacking intention-behavior gaps in meat consumption

Noah Linder<sup>a,b,c,\*</sup>, Therese Lindahl<sup>c,b</sup>, Nanda Wijermans<sup>b,d</sup>

<sup>a</sup> Global Economic Dynamics and the Biosphere, Royal Swedish Academy of Science, Stockholm, Sweden

<sup>b</sup> Stockholm Resilience Centre, Stockholm University, Stockholm, Sweden

<sup>c</sup> Beijer Institute of Ecological Economics, Royal Swedish Academy of Sciences, Stockholm

<sup>d</sup> The Institute for Future Studies, Stockholm, Sweden

### ARTICLE INFO

**Keywords:**  
Sustainable food system  
Consumers  
Food choices  
Protein shift  
Habits  
Attitudes

### ABSTRACT

Promoting a shift away from meat consumption towards an increased share of plant-based alternatives is a promising strategy for addressing environmental challenges while also improving population health. Many consumers already express a strong interest in adopting more sustainable and healthy diets, however, empirical evidence suggests that there is only a weak link between these intentions and actual dietary changes. To unpack this intention-behavior gap this study explores three research questions 1) What factors explain intentions to reduce meat consumption among meat eaters? 2) How much meat do individuals with reduction intentions consume, compared to those without such intentions? and 3) Among participants with reduction intentions — what factors drive their continued meat consumption? To answer these questions, we developed a survey and recruited a nationally representative sample of Swedish consumers ( $n = 998$ ). A backwards stepwise regression, including 14 theoretically informed variables, revealed that attitudes — towards meat ( $\beta = -0.32$ ) and plant-based proteins ( $\beta = 0.35$ ) both — were the strongest predictors of intentions to reduce meat consumption. Individual factors like environmental self-identity ( $\beta = 0.13$ ) and gender ( $\beta = 0.08$ ) played smaller but meaningful roles as did practical considerations such as the perceived convenience of cooking meat compared to plant-based foods ( $\beta = 0.09$ ). Furthermore, although the result showed a significant difference in self-reported meat consumption between individuals with high stated intentions to reduce meat intake and those with low or no intention, the size of the difference was small only ( $d = 0.15$ ), bordering negligible, reaffirming the suspected intention-behavior gap. Among those with intentions to lower their meat consumption, only two key variables emerged as driving continued meat eating — *meat purchasing habits* ( $\beta = 0.33$ ) and a *positive attitude towards meat* ( $\beta = 0.17$ ). These results underscore the challenges of translating intentions into action and highlight how different variables are important for a) shaping intentions and b) driving these into actions. While intentions are a needed prerequisite for voluntary behavior change, they sometimes prove insufficient on their own, especially when the aim is to change behaviors heavily governed by habits. Practical implications suggest that focusing on fostering positive attitudes towards plant-based alternatives are key in bridging the gap

Forskningssyfte – utforska dessa intentioner att minska köttkonsumtion

RQ1: Vad skapar intentioner att minska köttkonsumtionen?

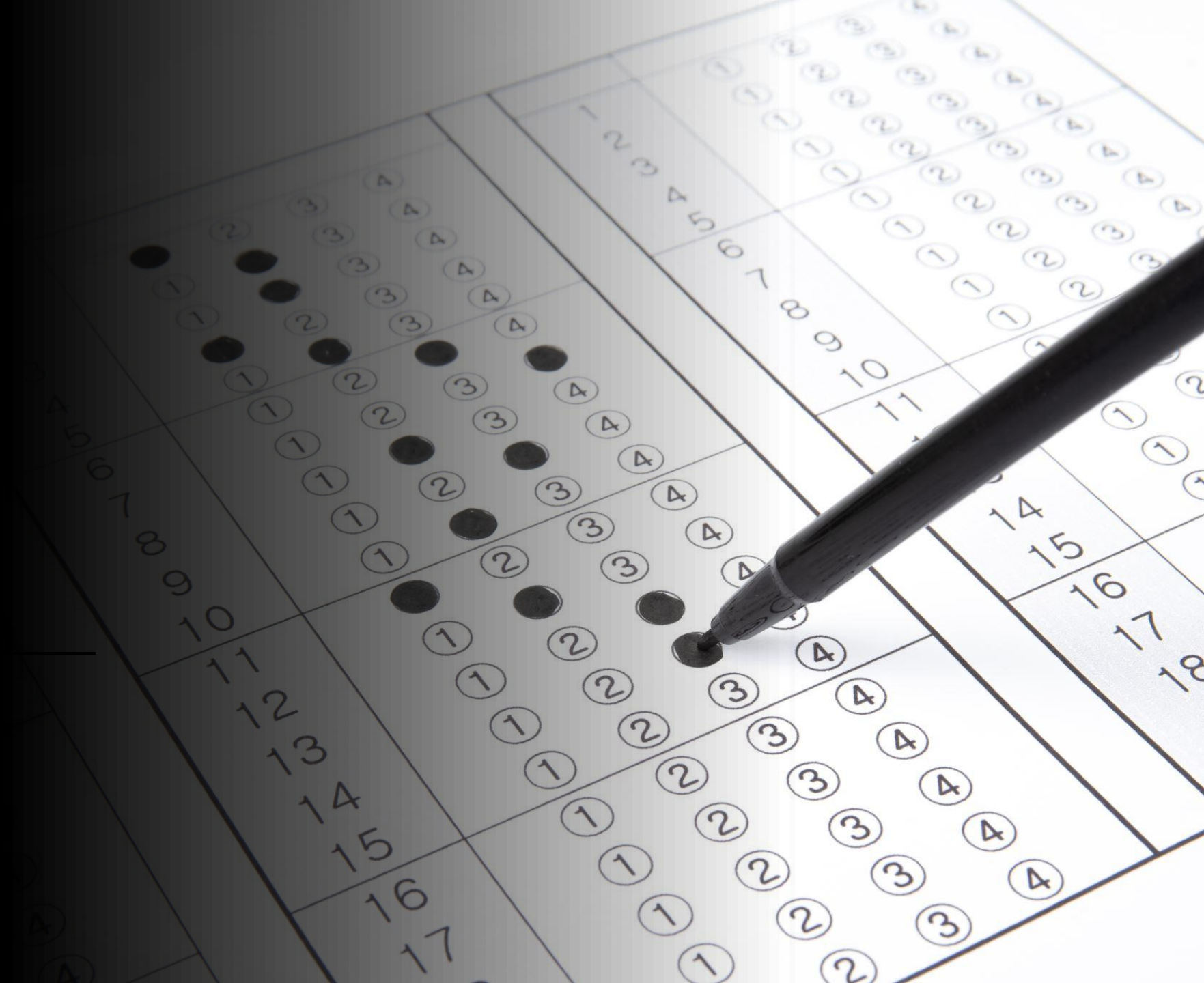
RQ2: Hur mycket kött äter personer med dessa intentioner jämfört med konsumenter utan sådana uttalade intentioner?

RQ3: Bland deltagare som har intentioner att äta mindre kött – vilka variabler driver deras köttkonsumtion?





# Method - survey



# Self-reported food intake index

[Ägg] Under en typisk vecka (mån-sön) hur ofta konsumerar du följande produkter till lunch? För varje produkt markera alternativet som passar bäst in på dig.	2; Inte en gång er vecka men 1 till flera 3; En gång i veckan 4; 2-3 gånger i veckan 5; 3-6 gånger i veckan 6; I princip varje dag
[Ost (som huvudsaklig proteinkälla)] Under en typisk vecka (mån-sön) hur ofta konsumerar du följande produkter till lunch? För varje produkt markera alternativet som passar bäst in på dig.	1; I princip aldrig 2; Inte en gång er vecka men 1 till flera 3; En gång i veckan 4; 2-3 gånger i veckan 5; 3-6 gånger i veckan 6; I princip varje dag
[Växtbaserad ostsubstitut (som huvudsaklig proteinkälla) ] Under en typisk vecka (mån-sön) hur ofta konsumerar du följande produkter till lunch? För varje produkt markera alternativet som passar bäst in på dig.	1; I princip aldrig 2; Inte en gång er vecka men 1 till flera 3; En gång i veckan 4; 2-3 gånger i veckan 5; 3-6 gånger i veckan 6; I princip varje dag
[Rött kött som nöt-, fläsk- och lammkött ] Under en typisk vecka (mån-sön) hur ofta konsumerar du följande produkter till lunch? För varje produkt markera alternativet som passar bäst in på dig.	1; I princip aldrig 2; Inte en gång er vecka men 1 till flera 3; En gång i veckan 4; 2-3 gånger i veckan 5; 3-6 gånger i veckan 6; I princip varje dag
[Fågel som kyckling och kalkon ] Under en typisk vecka (mån-sön) hur ofta konsumerar du följande produkter till lunch? För varje produkt markera alternativet som passar bäst in på dig.	1; I princip aldrig 2; Inte en gång er vecka men 1 till flera 3; En gång i veckan 4; 2-3 gånger i veckan 5; 3-6 gånger i veckan 6; I princip varje dag
[Fisk eller annan sjömat (som räkor, musslor, kräftor) ] Under en typisk vecka (mån-sön) hur ofta konsumerar du följande produkter till lunch? För varje produkt markera alternativet som passar bäst in på dig.	1; I princip aldrig 2; Inte en gång er vecka men 1 till flera 3; En gång i veckan 4; 2-3 gånger i veckan 5; 3-6 gånger i veckan 6; I princip varje dag

# Nyckelvariabler

- Demografiska (kön, inkomst, utbildning, ålder, region, barn i hushållet, diet)
- Intentioner att minska köttkonsumtionen (generella och flexitarianer)
- Attityder (generella och kopplade till bekvämlighet)
- Vanor (automatiskt beslutsfattande)
- Självidentitet som miljövänlig



# Descriptive Statistics Summary

Table. 1 Summary of the survey sample compared to Swedish population

<i>Variable</i>	<i>Description</i>	<i>Swedish population</i>
<i>Sample Size (N)</i>	997 participants	10,54 millions
<i>Age Range</i>	18-91 (peak around ages 28-33)	Mean age 42
<i>Gender Distribution</i>	50.8% Male, 49.2% Female	49.6 Female
<i>Income</i>	Middle to high income majority	80% of Swedish population is in the middle- or high-income bracket
<i>Education Level</i>	42.1% had taken at least one university course	30% has higher education
<i>Kids in Household</i>	62.1% with no kids, 37.9% with kids	31.4% of Swedish households have kids
<i>High Intention to Lower Meat Consumption</i>	22.1%	n/a
<i>Flexitarian Identification</i>	18.8%	n/a

\* Swedish population data from, "world bank, Statistikdatabasen/ Statistikmyndigheten and Statista"

# RQ1: Vad skapar intentioner att minska köttkonsumtionen?

- Significant Predictors:

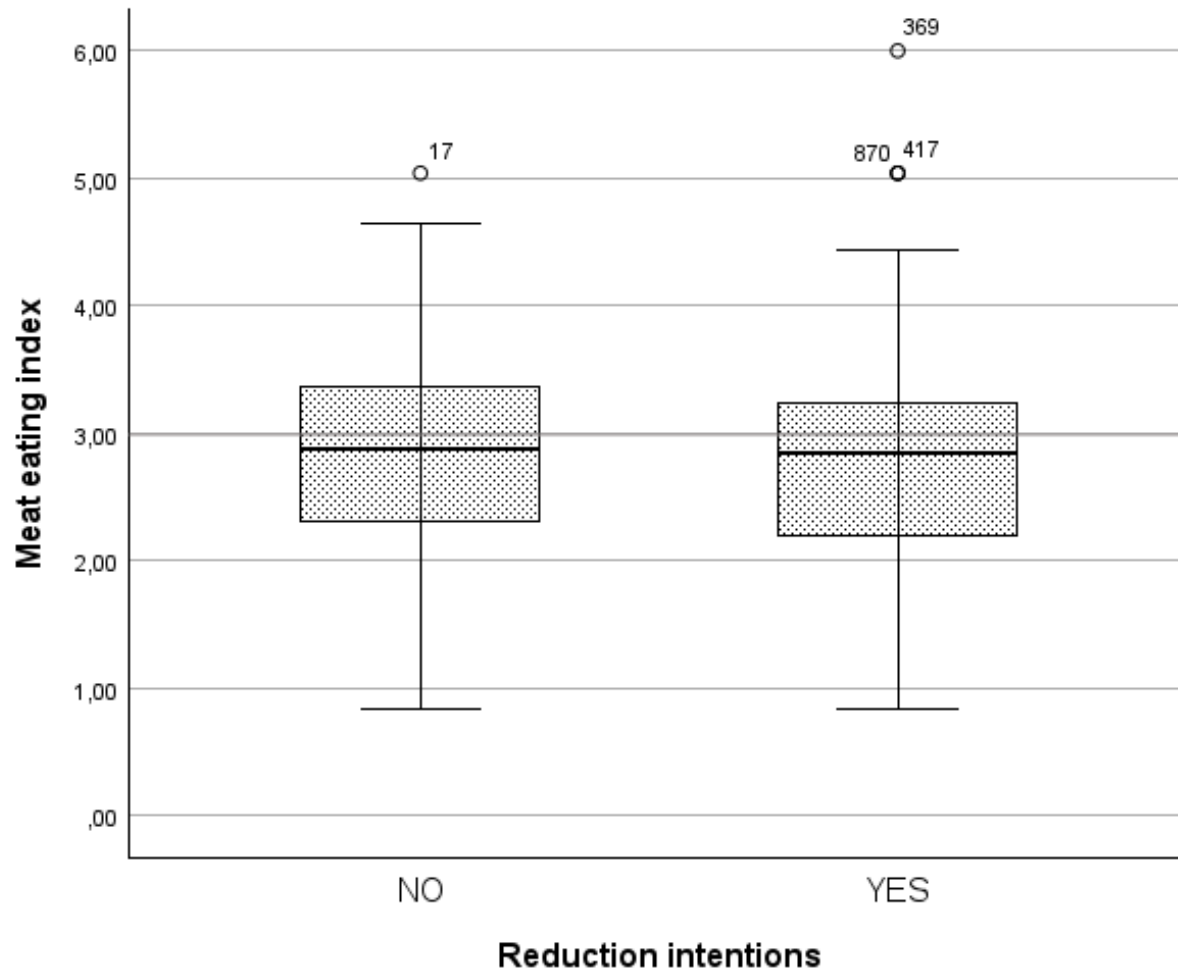
- Attitudes toward Plant-based (B = 0.381, p < 0.001)
- Perceived Convenience of Plant-based Options (B = 0.125, p < 0.01):
- Environmental Self-identity (B = 0.121, p < 0.001):
- Gender (B = 0.090, p < 0.01) being female
  
- Positive attitudes toward Meat (B = -0.264, p < 0.001)

- The regression model explains about 49.2% of the variance in meat reduction intentions ( $R^2 = 0.49$ ).

## Non-Significant Predictors:

- Perceived Convenience of Meat, Norms, Income, Education, Age, Region; Kids at home

RQ2: Liten, nästan försumbar skillnad i konsumtion mellan grupper med hög respektive låg intention att minska sin köttkonsumtion (Cohens  $d = 0,15$ )



# RQ3: Bland deltagare som har intentioner att äta mindre kött – vilka variabler driver deras köttkonsumtion?

## Significant Predictors:

- Habit of Meat Buying: (B = 0.228, p < .001)
- Attitudes toward Meat: (B = 0.160, p = .050)

## Non-Significant Predictors:

- **Attitudes** toward Plant-Based Foods, Perceived **Convenience** of Meat and Plant-Based Foods, **Environmental Identity**, Norms, Income, **Education**, **Age**, **Gender**, Region; **Kids at home**

## Model Fit:

- Adjusted R<sup>2</sup> = 0.197, p < .001

# Takeaways

- Tydligt intention–beteendegap
  - Endast en försumbar skillnad mellan grupperna
- Olika variabler är viktiga för a) att forma reduktionsintentioner och b) att omsätta dem i handling
- Vanebrytning är avgörande för konsumenter med starka reduktionsintentioner
  - Fokusera på strategier som hjälper konsumenter att bryta vanor
- En betydande del (nästan en fjärdedel) av vårt urval hade någon form av uttalad intention att minska kött
- Stor förändringspotential om dessa intentioner omsätts i handling
  - Sätt igång förändring, skapa dynamiska normer och mandat att agera
    - Bra plats att börja!



ELSEVIER

Food Policy 136 (2025) 102971

Contents lists available at ScienceDirect

Food Policy

journal homepage: [www.elsevier.com/locate/foodpol](http://www.elsevier.com/locate/foodpol)



# (Un)acceptable protein shift: Consumer attitudes toward retail-led interventions promoting sustainable diets

Noah Linder <sup>a,c,\*</sup>, Magnus Bergquist <sup>b</sup>, Pär Bjälkebring <sup>b</sup>, Malin Jonell <sup>a,c</sup>

<sup>a</sup> Global Economic Dynamics and the Biosphere, Royal Swedish Academy of Science, Stockholm, Sweden  
<sup>b</sup> Department of Psychology, University of Gothenburg 413 14 Gothenburg, Sweden  
<sup>c</sup> Stockholm Resilience Centre, Stockholm University, Stockholm, Sweden

## ARTICLE INFO

**Keywords:**  
Acceptability  
Retail-led interventions  
Sustainable diets  
Protein-shift  
Choice architecture  
Choice restrictions  
Social norms  
Price

## ABSTRACT

Transforming global and local food systems is essential for achieving current sustainability goals. A significant lever for the food sector is promoting a dietary shift away from animal-based proteins towards more plant-based options. Food retailers, positioned at the centre of the value chain, hold a uniquely influential role, as they have the capacity to shape the behaviours of both producers and consumers. However, consumer acceptability is a precondition for implementing behavioural change interventions. In this study, we assess consumer acceptability regarding public acceptability of various retail-led interventions. In this study, we assess consumer acceptability of five categories of food retail-led interventions: information-based, norms-based, choice architecture, price-based, and choice restriction. In this mission we developed a survey and recruited a nationally representative sample (n = 424), we found price manipulations and choice restrictions to be less accepted than strategies building on information, norms, and choice architecture. Furthermore, a multi-level model showed that perceived effectiveness, fairness, and freedom of choice were significant predictors of acceptance for the interventions, with the exception that freedom of choice did not predict support for either the norm-based intervention or choice architecture. Lastly, we showcase how older age, positive meat attitudes, and strong meat-buying habits hindered acceptance, while biospheric values, environmental identity, and altruism facilitated it. Two potential courses of retailer action are identified: (1) immediately implement high-support interventions based on information, social norms, and choice architecture and (2) explore how to convey intervention effectiveness to increase consumer acceptability of price-based interventions and choice restrictions.

## 1. Introduction

Transforming food systems is crucial for achieving sustainability goals, as it could play a significant role in mitigating climate change and reducing other environmental impacts (Crippa et al. 2021, Willett et al. 2019). A major lever for the food sector in most high-income countries this regard is promoting a dietary shift from animal-based proteins. This transition not only reduces greenhouse gas emissions but also

fiscal measures such as a carbon tax on food (Ran et al. 2024). However, there are notable examples of government-led interventions promoting sustainable diets (e.g. Reyes et al., 2021; ...)

# Ambitiösa mål

- **ICA Gruppen** Minska klimatpåverkan från kundernas livsmedelsinköp med 30 % till 2030 (basår 2022)
- **Coop** Minska klimatpåverkan från maten de säljer med 25 % till 2026
  - Mätning i kg CO<sub>2</sub>-ekvivalenter per kg produkt
- **Axfood** Minska klimatpåverkan per kilo såld mat med minst 10 % till 2030 (basår 2023)
- **Lidl Sverige** Öka andelen växtbaserade proteinkällor i sortimentet senast 2025



Konsumenternas acceptans av olika butiksledda åtgärder för att främja ett hållbart proteinskifte

- Information
- Normbaserade åtgärder
- Valarkitektur (Nudges)
- Prisbaserade åtgärder
- Valsrestriktion/ bekränsat urval.



# Information



- Very negative 1 2 3 4 5 6 7 Very positive

# Normbaserade åtgärder



# Valarkitektur (nudges)

---



# Prisbaserade interventioner



Valsrestriktion/  
begränsat urval.

---



# Hypoteser:

---

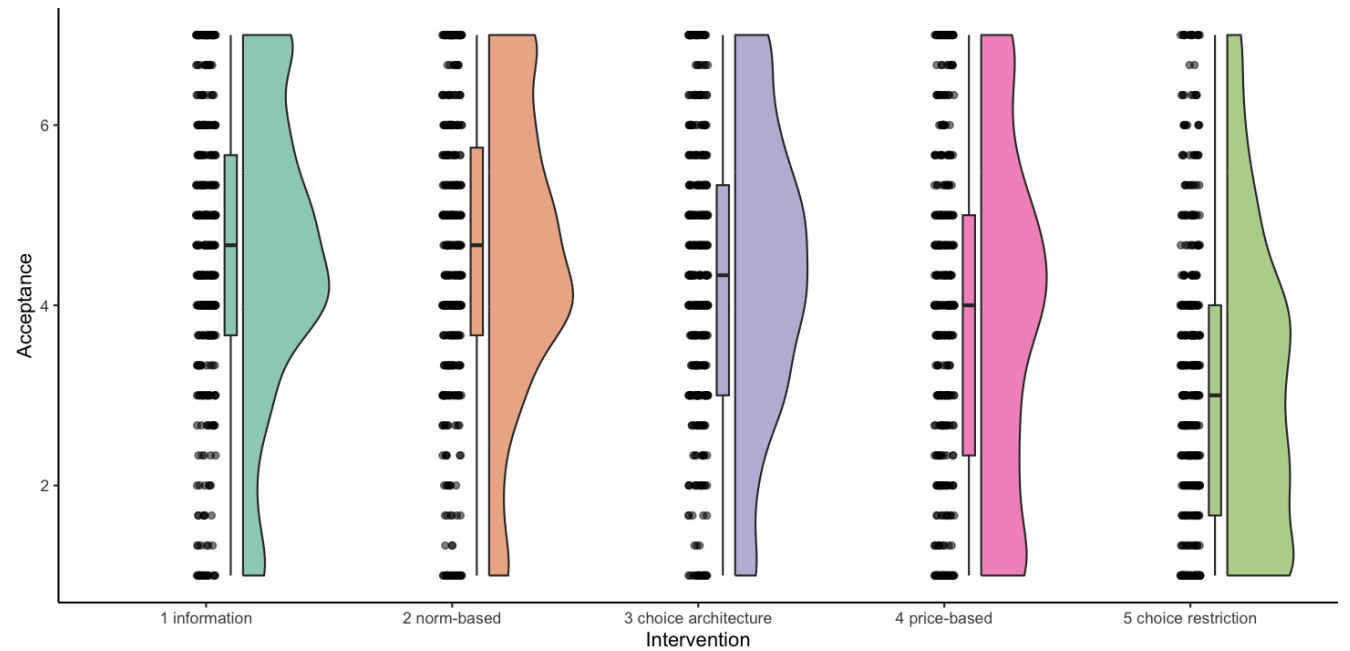
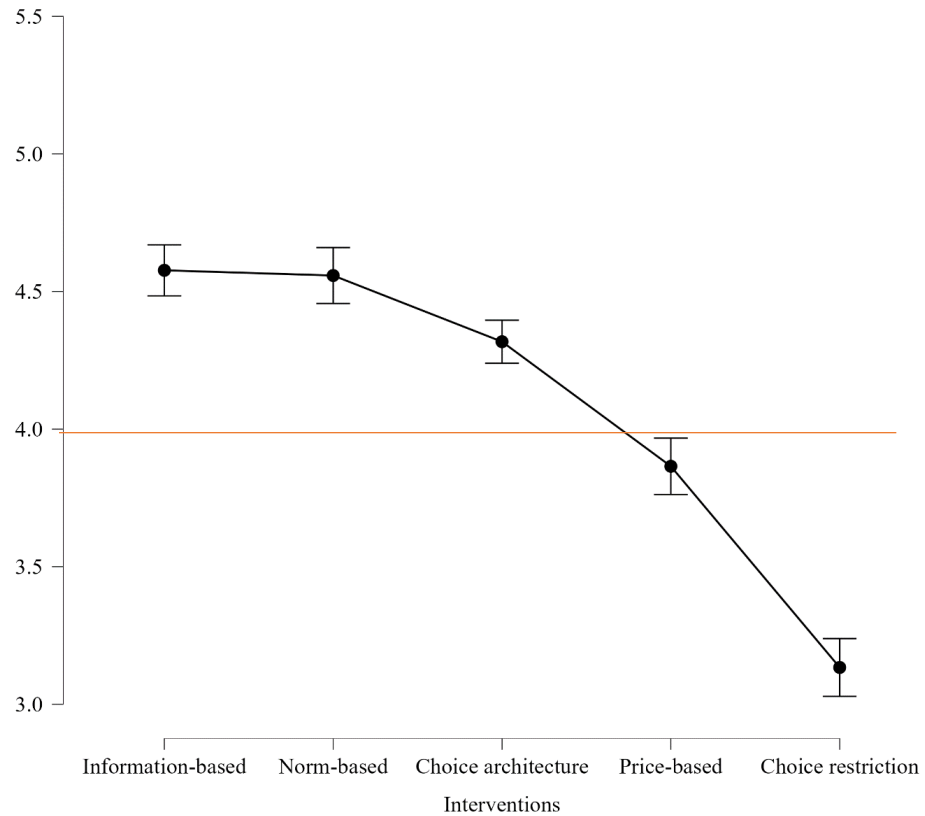
- H1: Acceptansen är högst för icke-påträngande åtgärder.
  - Kunskapsbyggande / information om trender och sociala normer accepteras bättre än valarkitektur,
  - som i sin tur accepteras bättre än prisbaserade åtgärder.
  - Den mest extrema metoden, begränsningar i urval, har lägst acceptans.
- H2: Åtgärder som uppfattas som orättvisa, begränsande av fri vilja eller ineffektiva har lägre acceptans.
- H3: Ju mer påträngande åtgärder, desto högre risk för backlash (motstånd från konsumenter).
- H4: självbild, värderingar, attityder, vanor, utbildning, ålder och kön påverkar acceptansen av åtgärder överlag.



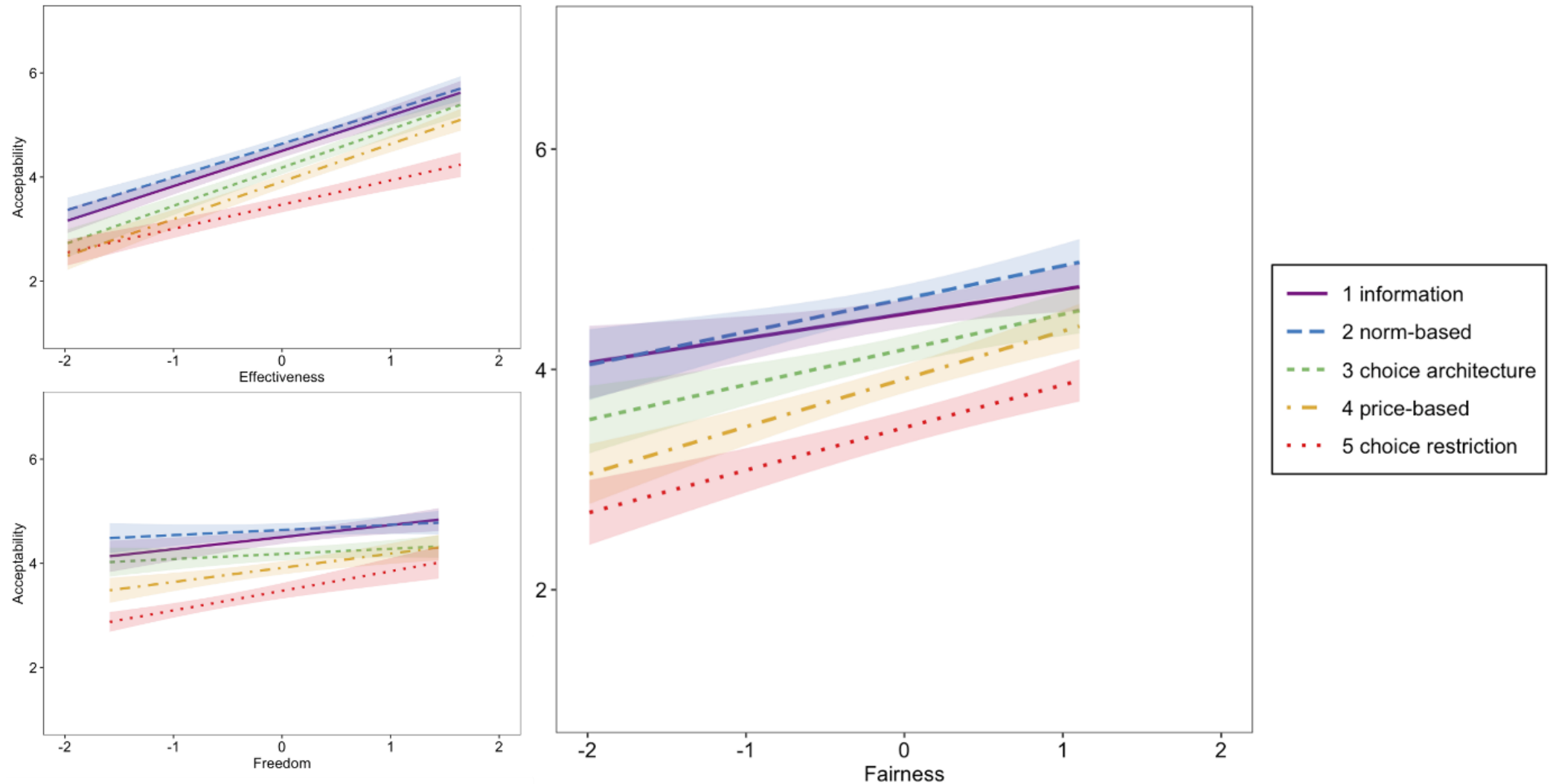
# Method - Enkätstudie



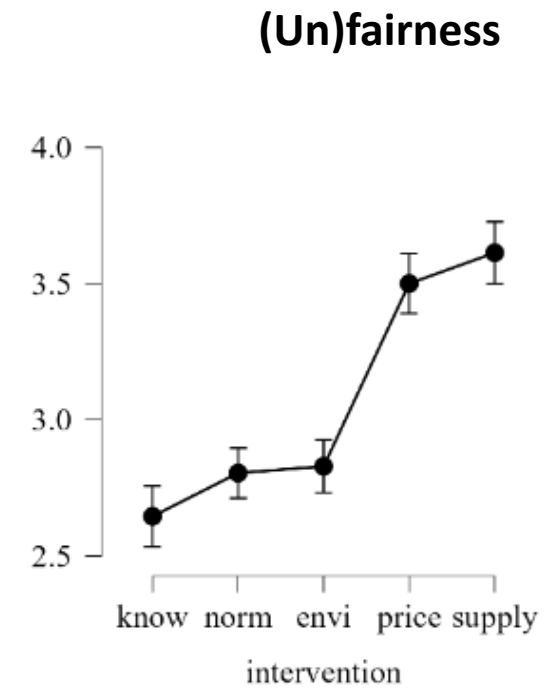
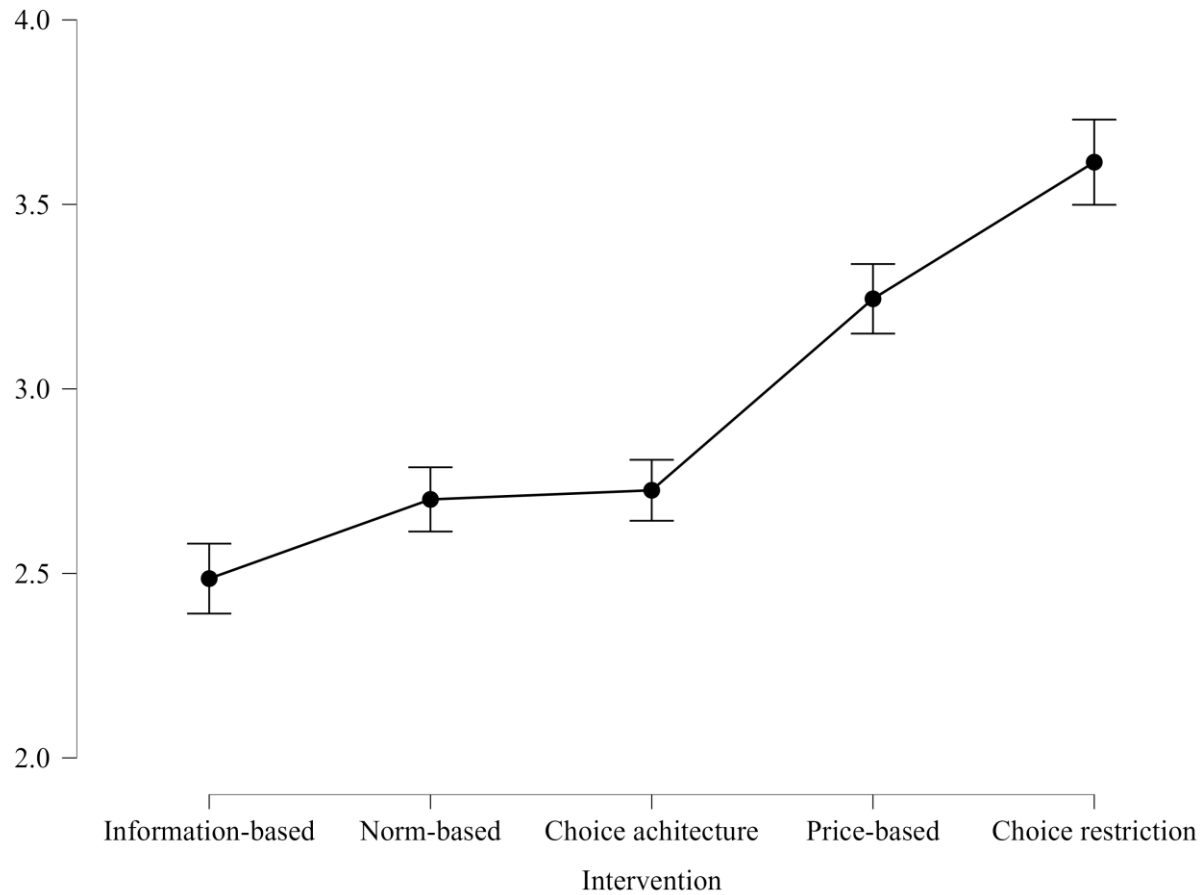
# Resultat: Acceptansen för olika åtgärder



# Skillnader i uppfattningen av åtgärderna påverkar acceptansen



# Risk för backlash



# Hur individuella skillnader påverkar acceptans

## Barriers:

- *Age (older)* -
- *Gender (man)* -
- *Meat buying Habits* -
- *Pro meat Attitudes* -

## Motivations:

- *Biospheric values* +
  - *Environmental self-identity* +
  - *Altruistic values* +
  - *Women* +
- 
- Income, education, number of people in the household, and number of children in the household was not significant





## Takeaways

- Skillnader i acceptans mellan olika åtgärder
  - Signifikanta skillnader i acceptans mellan de olika åtgärderna (utom olika typer av information)
  - Medelvärde: Information  $M = 4,56$  vs Begränsat urval  $M = 3,13$
- Acceptansen beror delvis på om interventionerna uppfattas som effektiv, samt i viss mån rättvisa och frihetsbevarande
  - Rättvisa och frihet blir viktigare ju mer påträngande åtgärden är (pris och begränsningar i val)
- Respondenterna var generellt positiva till information, normbaserade åtgärder och valarkitektur
  - Detta trots att åtgärderna syftar till det ibland kontroversiella ämnet: att minska köttkonsumtion

Tack för att ni har lyssnat!



Reserach gate

