Title: Information provision and consumer behaviour: Does CO_2 emission awareness make us more climate friendly?

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Introduction:

We will investigate if the provision of information about CO_2 emissions connected to own food purchases influences food purchases. Concretely, we will invite a randomly selected representative sample (drawn by Statistics Denmark, n=50.000) of Danes to participate in the study. The selected individuals will be invited through the official public digital mailing platform in Denmark (called E-boks) based on their social security number. Different versions of the invitation letter will be randomized among the sample. The basic version is written in neutral terms explaining the project, another version of the invitation will, in addition to the neutral description, mention the projects' importance for the climate, yet a third will add the economic benefit associated with the project for the participants.

If the participants accept the invitation, they sign-up to the study by answering a short questionnaire on health, economic, climate and food-security issues related to food consumption. This questionnaire appears on the project website (created in Qualtrics), where further instructions about the project are also provided. After being enrolled into the project, the participants are randomized into one of three different treatments. In one treatment, they are asked to download and register on an app providing an economic overview of their food purchase (called Spenderlog). In a second treatment, they are asked to download and register on an app which gives an overview of the CO_2 emission resulting from their food purchase (called Co2Food). In a third group, they are asked to download both apps. Our aim is to compare the food purchases in the groups before and during the intervention.

1) **Research Question.** What is the effect on food purchases of providing information about CO_2 emissions resulting from own previous purchases, compared to providing financial information of own purchases.

2) **Variables.** We collect four groups of variables:
   1) Food purchase data: Tracked through the two apps that the respondents are using. The apps are managed by the company Spenderlog. We get information about which food items are bought, divided into food categories, shop types, costs and CO_2 emission estimates
   2) App usage: From the app we will know if participants are using the app, if they set up goals concerning their CO2 emission or food consumption, and if they choose to set a comparison of their own consumption with the consumption of others and if they later change it.
   3) Recruitment: We have information on which type of invitation letter the participants have received, their signing up process, the randomization to treatments and their answers to the survey at the start and at the end of the experiment
   4) Register data on all invited participants: demographic, economic, education, family and occupation.

3) **Data Collection.** No prior data has been collected. The data collection will begin in January 2020, and continue until Summer 2020.

4) **Treatments.** As mentioned in the introduction, we conduct a randomization across invitation letters and an orthogonal randomization across the food purchase apps.

   Invitation letter. 1) Neutral description of the project and participation. 2) Same as the neutral and additionally highlights the link between the climate and food consumption 3) Same as the neutral and additionally highlights the link between saving money and food consumption.

   Apps: Automated recording of food purchases via electronic receipts are used to provide participants feedback on their consumption. Treatment 1) The Spenderlog app. It gives an overview of the money spent on own food consumption. Treatment 2) The CO2Food app. It gives an overview of the estimated CO2 emission resulting from own food consumption. Treatment 3) Participants are given both apps.

5) **First Analysis.** Selection analysis: we wish to analyze the process from receiving an invitation to enrolling as a participant. We will randomly send out different versions of the invitation letter to understand how different motives (economic or climate) affect participation. The recruitment letters are framed differently by focusing on food consumption in relation to money, climate, or not. We will compare sign-up rates across the different invitation letters. Furthermore, we will link information about participation to register data, to understand how demographic characteristics influence the tendency to participate.

6) **Second Analysis.** Consumption behavior: we will compare consumption in the experiment period across the treatments. Furthermore, historical data are available from before the experiment, to the extent that people have been using e-receipts in the period prior to the experiment. With the historical data we will compare differences in the size of the purchases (number of items purchased), costs and related CO2 emissions, across the treatment groups (diff-in-diff). We will also examine engagement with the app and will examine heterogeneous treatment effects by recruitment letter and an index of concern about the climate using the baseline survey. In secondary analysis, we will examine heterogeneous effects by gender, age, income, location, education and occupation.

7) **Third analysis.** Attitude vs actual behavior: We will analyze how attitudes about climate, food expenditures, health, and food security relate to actual food purchases derived from the consumption data from app. We will measure attitudes through repeated surveys.

8) **Fourth analysis.** Continuous information provision: 2-3 months after that the participants are enrolled into the project, push-notifications will be sent to the participants. The content of the push-notifications is to be decided based on the evidence collected in the initial phase of the project. If the engagement of respondents is low, the push-notifications will be focused on enhancing it. If the engagement of respondents on the app usage is sufficient, the push-notifications can be styled for additional purposes (e.g. promoting general and specific information about climate-, money-, or health-concerns related to food consumption).

9) **Sample size and Power.** Through Statistics Denmark, we get a representative sample of the Danish population of 50.000 individuals. We will send an invitation to them. We expect a 5% participation rate, resulting in n=2500. N=833 per treatment, MDES of 0,14 SD