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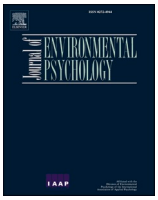

# Increasing the uptake of plant-based diets: An analysis of the impact of a CO2 food label

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ABSTRACT

Reducing the environmental footprint of the global food system significantly depends on shifting to more plant-based diets. However, deep-rooted eating habits and a general lack of awareness about food-related emissions hinder large-scale dietary shifts. Demand-side food policies can accelerate this transition towards plant-based diets. One policy instrument that may increase awareness of diet-related emissions and facilitate climate-friendly food consumption choices is a CO2 food label. The success of such demand-side food policies depends on socio-political and market acceptance. However, there is a lack of empirical evidence regarding the socio-political (i.e., feasibility) and market acceptance (i.e., effectiveness at changing behavioral intentions) of CO2 food labels. We also require more knowledge about the potential spillover effects of CO2 food labels on support for more ambitious demand-side food policies. The paper presents evidence from a survey experiment with a sample of Swiss residents (N = 2372) who were randomly provided with information about an established CO2 food label. The survey experiment was embedded in a cooperation throughout a larger long-term project with the second-largest Swiss retailer, which launched one of the world's first CO2 food labels in 2021. Findings show that providing information on a CO2 food label strengthens individuals' behavioral change intentions and support for a mandatory governmental CO2 food label. However, no spillover effect on support for other food policy instruments is identified, which also means that the study finds no crowding out effect by voluntary CO2 labelling initiatives on the support of governmental food policy measures. The results imply that a CO2 food label enjoys high market and socio-political acceptance.

## 1. Introduction

To reduce greenhouse gas emissions and keep the goals of the 2015 Paris Agreement within reach, ambitious climate action is required. Recent studies show that designing and implementing ambitious demand-side policies that change consumption patterns is essential for governing climate action efforts successfully and achieving net zero (Creutzig et al., 2016; IPCC, 2022a; Mundaca, Ürge-Vorsatz, & Wilson, 2019; Poore & Nemecek, 2018). One area in which demand-side mitigation efforts are particularly relevant to governing the mitigation of climate change is the global food system. Increasing scientific evidence shows that the current global food system is responsible for up to 37 percent of global anthropogenic greenhouse gas emissions and contributes, amongst other things, to biodiversity loss, water scarcity, and deforestation, risking global food security in the long term (Clark et al., 2020; Crippa et al., 2021; IPCC, 2022b; Willett et al., 2019). Further, unsustainable diets – especially the excessive consumption of animal products in industrialized countries – are a significant driver of the food systems' negative environmental externalities (IPCC, 2022b; IPES-Food, 2022; Poore & Nemecek, 2018; Westhoek et al., 2014). Although transforming the global food system will require action and changes by multiple actors along the supply chain (Poore & Nemecek, 2018), there is a growing consensus in the literature that a demand-side shift that increases the share of plant-based diets would significantly decrease the carbon footprint of the latter (IPCC, 2022b; IPES-Food, 2022; Lemken, Zühlsdorf, & Spiller, 2021; Swiss National Science Foundation, 2020; Willett et al., 2019). Moreover, the climate change mitigation potential of shifting dietary patterns (e.g., by reducing meat consumption) clearly exceeds technological mitigation potential on the food production side (Pechey, Reynolds, Cook, Marteau, & Jebb, 2022; Poore & Nemecek, 2018; Popp, Lotze-Campen, & Bodirsky, 2010). However, due to deeply rooted food consumption habits and a general lack of knowledge about food-related emissions, amongst other factors, dietary patterns are not easily changed without ambitious demand-side food policies (Constantino et al., 2022; Hartmann & Siegrist, 2020; Kukowski, Bernecker, Nielsen, Hofmann, & Brandstätter, 2023). Thus, demand-side policies

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are critical to reducing the environmental footprint of the global food system (IPES-Food, 2022). Such demand-side food policies are associated with different types of instruments – namely, information-based instruments (e.g., food labels), nudges[1] (e.g., changing the position and number of plant-based items on menus), market-based instruments (e.g., taxes and subsidies), and regulatory instruments (e.g., regulations on the minimum share of plant-based dishes in public cafeterias) (Ammann, Arbenz, Mack, Nemecek, & El Benni, 2023). Further, market-based and regulatory instruments are typically perceived to be more costly or intrusive than information-based and nudging instruments (Ammann et al., 2023; Fesenfeld, Wicki, Sun, & Bernauer, 2020).

On the one hand, due to the highly visible costs, especially of more stringent demand-side food policy measures such as increased taxes on meat, political feasibility is becoming a main barrier to the introduction of new policies (Fesenfeld, Sun, Wicki, & Bernauer, 2021; Graham & Abrahamse, 2017). The political feasibility of implementing transformative food policies, especially in democratic countries and regarding more stringent food policy instruments, depends on citizens' socio-political acceptance of these policies (Pechey et al., 2022). On the other hand, the effectiveness of policies is also a key factor in changing behavioral patterns at scale (Defila, Di Giulio, & Ruesch Schweizer, 2018; Verbeke et al., 2010). In the food-policy context, the effectiveness of ambitious behavioral policies strongly depends on the market acceptance of the measures; i.e., on individuals' willingness and intentions to shift their consumption behavior (Defila et al., 2018). Moreover, both roles of individuals as consumers and citizens are interlinked (Defila et al., 2018; Spaargaren & Oosterveer, 2010; Tienhaara et al., 2015) and thus both market and socio-political acceptance of food policies can influence each other. Although the food consumption and policy literature gives insights into the factors that enhance or inhibit a demand-side shift to more plant-based diets by investigating citizens' support for food policies (Fesenfeld et al., 2021, 2022, 2023; Kramer & Sucky, 2021; Lemken et al., 2021) and food consumption intentions, as well as, behavior (Apostolidis & McLeay, 2016; Graça, Godinho, & Truninger, 2019; Hagmann, Siegrist, & Hartmann, 2019; Kamm, Hildesheimer, Bernold, & Eichhorn, 2015; Stubbs et al., 2018), there is a lack of research that simultaneously studies the socio-political acceptance (i.e., the political feasibility) and the market acceptance (i.e., the effectiveness) of demand-side food policies. This paper addresses this gap by experimentally studying both factors.

One demand-side policy that is increasingly being discussed is a CO2 label for food products. A CO2 food label can be classified as a less stringent information-based instrument that is designed to shift consumer behavior. Arguably, the effects of such a label may be limited due to individuals' budget constraints, their limited capacity to process the information on the label and deeply rooted eating habits (Camilleri, Larrick, Hossain, & Patino-Echeverri, 2019; Lemken et al., 2021). Nevertheless, a CO2 label may still play a crucial role in facilitating climate-friendly consumption choices due to facilitating comparison not only within but across food types (Garnett, 2023), especially for consumers who are motivated to reduce their diet-related CO2 emissions (Lemken et al., 2021). Further, such labels can help to increase people's awareness about the climate footprint of different food products, and potentially even increase citizens' support for more stringent climate food policy measures (Fesenfeld, Rudolph, & Bernauer, 2022; Lemken et al., 2021). Indeed, the findings of a recent study show that if a behavior, e.g., paying attention to the CO2 impact of foods when shopping, is perceived to be feasible, this has a positive impact on the support of a policy regulating the respective behavior (Kukowski, Hofmann, et al., 2023). In addition, especially mandatory CO2 food labels may in the long run impact producers' product formulations, e.g., of the convenience products offered, to improve their label ranking (Garnett, 2023). Therefore, CO2 labels may be an effective and politically feasible entry-level instrument that is better accepted than more stringent demand-side policy measures such as higher taxes on meat.

Some CO2 food labeling projects already exist, including projects by companies to voluntarily disclose the carbon footprint of their food products (e.g., the Carbon Disclosure Project by Nestlé), as well as attempts to establish a mandatory labeling scheme (e.g., as part of the EU Farm-to-Fork strategy) (Lemken et al., 2021). One of the few large voluntary CO2 labelling schemes currently in place is the Mcheck label launched in 2021 by Migros, the second biggest retailer in Switzerland, which ranks its food products from one star (worst climate footprint) to five stars (best climate footprint) (Migros, 2022). The rankings were developed and verified by Migros in cooperation with external scientific partners. With the retailers' large market share of about 35 percent in Switzerland (Statista, 2020) and the resulting high visibility of the label on the Swiss market, this initiative is an interesting case in terms of understanding consumers' market acceptance and socio-political acceptance of food policy measures. However, despite some research in this area (Brunner, Kurz, Bryngelsson, & Hedenus, 2018; Camilleri et al., 2019; Kaczorowska, Rejman, Halicka, Szczebyło, & Górska-Warsewicz, 2019; Lemken et al., 2021), there is a lack of empirical evidence regarding the latter issues. Moreover, examining the implications of the voluntary labeling initiative is particularly relevant in the Swiss case due to the strong reliance on direct democracy and the resulting impact of public opinion on the political decision-making process. In addition, the insights may also be relevant for informing other voluntary and mandatory labeling initiatives. Therefore, the present study examines how information about an established voluntary CO2 labelling initiative affects both the market acceptance and the socio-political acceptance of demand-side food policies, as well as the potential relation between the two types of acceptance. More specifically, the study analyzes the effect of information on a retailer's CO2 label for food products on individual food consumption intentions (i.e., market acceptance) and on the support for food policy measures aimed at reducing diet-related CO2 emissions and citizens' general preferences for more governmental regulation in the food sector (i.e., socio-political acceptance).

I examine these open empirical questions through a quantitative survey experiment with a representative sample of 2372 respondents in Switzerland. In the following, the theoretical background of the study is elaborated, and hypotheses are derived about how information on CO2 labels may affect behavioral intentions and policy support. The next sections discuss the data and methods, followed by the empirical results. Finally, the study closes with a summary of the most important results and some conclusions, highlighting the implications for politicians.

## 2. Theoretical background

As described above, the socio-political acceptance by individuals as citizens and market acceptance by individuals as consumers of food policy measures are key to determine whether it is politically feasible to implement a measure and whether the measure will be effective in terms of changing individuals' attitudes, intentions, and through that potentially also behavioral patterns. Thus, it is important when evaluating the feasibility and effectiveness of food policy measures to examine individuals' preferences focusing on two different social roles of individuals, namely consumers and citizens (as in Nielsen, Nicholas, Creutzig, Dietz, & Stern, 2021).

The concepts of socio-political and market acceptance are taken from the social acceptance framework (Wüstenhagen et al., 2007) that has been frequently used in studies that analyze the acceptance of innovations in renewable energies. In the framework Wüstenhagen et al. (2007) propose that social acceptance has three dimensions: socio-political acceptance, market acceptance, and community acceptance. The first dimension of social acceptance is the socio-political

[1] Nudging techniques seek to steer people's behavior without mandating or forbidding options, e.g., by providing more plant-based menu options.

acceptance of policies by the public, key stakeholders, and policymakers. The second dimension is the market acceptance, depending on the study context in terms of revealed behavior as well as attitudes and behavioral intentions (Peñaloza et al., 2022), of policies by consumers and investors. The third dimension is community acceptance (e.g., of local siting decisions for renewable energy technologies) by directly affected actors, such as local communities. All three dimensions are relevant in different contexts and are sometimes interdependent (Wüstenhagen et al., 2007). The third dimension is more relevant in cases when infrastructure projects need to be approved by a local community and concerns procedural and distributional justice – for example, associated with renewable energy technologies (Dermont, Ingold, Kammermann, & Stadelmann-Steffen, 2017; Wüstenhagen et al., 2007). Thus, this third dimension of acceptance is less relevant in the context of the current study. Building on Wüstenhagen et al. (2007), Dermont et al. (2017) offer a framework that provides guidance on using the three social acceptance dimensions from a policy-making perspective. Thus, applying the framework by Dermont et al. (2017), I specify the object of interest – i.e., the relevant social acceptance dimensions – as well as the relevant actors and their respective roles.

The actors of interest in this case are individuals in their roles as citizens and consumers. In their latter role, individuals account for a significant share of food-related greenhouse gas emissions (Swiss National Science Foundation, 2020; IPES-Food, 2022; Swiss National Science; Willett et al., 2019), thus, it is important to understand how a CO2 food labeling initiative may impact their behavioral intentions and through that potentially also behavioral patterns. Therefore, analyzing individuals' market acceptance is relevant since it is essential to generating effective, sustainable food policy. Further, it is important for policymakers to see whether a less stringent measure, such as a CO2 food labeling initiative, can obtain majority support and positively impact citizens' support for the later adoption of more stringent food policy measures that are necessary for effectively transforming the food system (Lemken et al., 2021). Moreover, it is important to understand whether a label can impact citizens' general preferences for more governmental regulation in the food sector (Fesenfeld et al., 2022). Therefore, analyzing individuals' socio-political acceptance is relevant since this is an essential part of a feasible, sustainable food policy. When analyzing socio-political acceptance, the present study follows the argument of Dermont et al. (2017) stating that policy studies applying the social acceptance framework should focus on the actor response (i.e., preference, support, or acceptance) that is "politically necessary for successful implementation" in the respective study context rather than focusing only on acceptance. Hence, the present study focuses on individuals' policy support.

Studies that have looked at the role of individuals as consumers and as citizens find that the roles are interrelated and deserve consideration in relation to evaluating policies or measures aimed at influencing consumer behavior (Defila et al., 2018; Spaargaren & Oosterveer, 2010; Tienhaara et al., 2015). However, the attitudes and decisions of individuals in the roles of consumers versus citizens are not necessarily fully consistent (Defila et al., 2018; Verbeke et al., 2010; Waterfield et al., 2020). For instance, Verbeke et al. (2010) show that individuals who are more critical about meat consumption in their role as citizens do not necessarily buy less meat as consumers. This may be due to individuals as citizens not only being motivated by self-interest but also by considerations about the well-being of society or the environment (Defila et al., 2018). Thus, regarding how individuals assess prospective policy measures, both roles (and therefore the dimensions of acceptance) matter: i.e., market acceptance by individuals as consumers *and* socio-political acceptance by individuals as citizens. Tienhaara et al. (2015), who looked at the decision-making of individuals in these roles, showed that decision-making in both contexts is interrelated. However, individuals face very different constraints in these contexts, thus decision-making can be rather inconsistent (Defila et al., 2018; Verbeke et al., 2010; Waterfield et al., 2020). The interrelatedness of individuals as citizens and consumers is also reflected in policy studies; for instance, Fesenfeld (2022) argues that individuals' perceptions of policy effectiveness, i.e., market acceptance, can impact policy feasibility, i.e., socio-political acceptance.

Research on the demand-side shift to more plant-based diets has primarily focused on individuals in either their role as consumers or citizens. Studies that focus on individuals as consumers especially highlight the role of information on the environmental and health impacts of excessive meat consumption, perceived social norms, and behavioral nudges as a lever for changing dietary patterns (Fesenfeld et al., 2023; Hagmann et al., 2019; Kamm et al., 2015; Stubbs et al., 2018). However, research is increasingly focusing on individuals as citizens, looking at the support for different food policies or policy packages, including ambitious demand-side policies that aim to encourage the shift to more plant-based diets (Fesenfeld et al., 2020, 2022, 2023; Kramer & Sucky, 2021; Lemken et al., 2021). In contrast to most of these studies that focus on one dimension of social acceptance, the present study simultaneously focuses on both dimensions and, therefore, roles of individuals as consumers and citizens and their potential interrelatedness. I argue that having more information about the carbon footprint of diets can alter individuals' attitudes and behavioral intentions concerning more sustainable food consumption and support for related policies. More specifically, I argue that information on the CO2 impact of food products communicated in the form of a food label in an everyday shopping context can increase individuals' intentions to decrease their food consumption-related greenhouse gas emissions. An increase in awareness of the carbon footprint of food and related reduction intentions will then increase the market and socio-political acceptance of demand-side food policies.

This argument builds on research on the role of information in influencing individuals' attitudes toward more sustainable food consumption and respective policy support. Several studies mention the crucial role of information and education in increasing knowledge and awareness about health and sustainability aspects of our diets, and particularly on the climate impact of different food products (Apostolidis & McLeay, 2016; Brunner et al., 2018; Carlsson, Kataria, & Lampi, 2022; de Boer & Aiking, 2017; Fesenfeld et al., 2020, 2023; Graham & Abrahamse, 2017; Happer & Wellesley, 2019; Lemken et al., 2021; Van Loo et al., 2017; Willett et al., 2019). For instance, Camilleri et al. (2019) show that providing information on the greenhouse gas emissions of foods increases the consumption of products with lower emissions. Other studies also investigate the role of information in socio-political acceptance, e.g., by influencing citizens' policy support intentions. For instance, Fesenfeld et al. (2023) find that information on the negative impacts of meat consumption and the benefits of meat substitute consumption on health, animal welfare, and the environment can increase support for more ambitious meat reduction policies, such as higher taxes.

In addition to the literature that analyzes the influence of information provision in general, the impact on consumer behavior and policy support of information in the concise form of a CO2 label on foods has been analyzed (Camilleri et al., 2019; Kaczorowska et al., 2019; Kramer & Sucky, 2021; Lemken et al., 2021). In general, food labels are perceived relatively positively (Kramer & Sucky, 2021; Pechey et al., 2022), which lessens the risk of potential resistance to such measures. Therefore, a CO2 label on food products may be an effective entry-level instrument for increasing awareness of food-related emissions and potentially lead to changes in consumer behavior and policy support (Camilleri et al., 2019; Lemken et al., 2021). In contrast to a public information campaign, labels on food products are more visible in everyday shopping situations and can be perceived as a form of information treatment, given that people pay attention to labels and are sufficiently visible on packaging.

### 2.1. The effect of promoting a CO2 food label on market acceptance

Regarding market acceptance and consumption decisions, research shows that the average level of knowledge about the emissions related to different food products is relatively low (Happer & Wellesley, 2019; Hartmann & Siegrist, 2017; Kamm et al., 2015; Stubbs et al., 2018). Accordingly, it is argued that decisions can be influenced by well-designed labels that facilitate the choice of lower-emission products (Camilleri et al., 2019; Lemken et al., 2021). However, to effectively influence consumption decisions, information provided by labels needs to be comprehensible, concise, transparent, and verified by a reputable third party to increase its credibility and perceived trustworthiness (Kramer & Sucky, 2021; Lemken et al., 2021). Moreover, factors that can inhibit the effectiveness of CO2 labels in influencing purchasing decisions identified in the literature include, amongst others, label design issues (Kortelainen, Raychaudhuri, & Roussillon, 2016), other factors influencing the purchasing decision such as taste preferences (Brunner et al., 2018), and the lack of accompanying information or provision of context (Spaargaren et al., 2013). Thus, to be effective, familiarity with the label needs to be increased (e.g., through promotional activities) to improve individuals' awareness of the label and the likelihood of it being considered in the decision-making process (Kaczorowska et al., 2019; Lemken et al., 2021).

With regard to evaluating the market acceptance of a CO2 label, the theory of planned behavior is a well-known and often-cited behavioral model to measure behavioral intentions (Ajzen, 1991; Fishbein, 2008). According to the theory, the strength of behavioral intentions is an important predictor of actual behavior. This strength of intentions is impacted by individuals' attitudes towards a behavior and perceived social norms when engaging in the behavior – for example, the perception that others approve/disapprove of a CO2 food label (Ajzen, 1991; Fishbein, 2008). In the food context, the relevance of the theory of planned behavior is supported by Berndsen and van der Pligt (2004), who show that the intention to consume less meat is influenced by individuals' attitudes and perceived social norms. Further, perceived behavioral control is also a relevant predictor of both behavioral intentions and the translation of intentions into actual behavior (Ajzen, 1991; Fishbein, 2008). Studies support the claim that perceived behavioral control plays an important role in food consumption decisions (Berndsen & van der Pligt, 2004; Eker, Reese, & Obersteiner, 2019; Graça et al., 2019; Lacroix & Gifford, 2020). More specifically, the degree of perceived behavioral control is influenced by the individual's perceived ease and self-efficacy of engaging in a particular behavior, such as buying a product with a CO2 food label (Sussman & Gifford, 2019). Stronger perceptions of behavioral control impact the likelihood of behavioral intentions being translated into actual consumption behavior.

To sum up, the literature indicates that by increasing the awareness of food-related emissions, a CO2 label on food can influence attitudes towards and the perceived social norms associated with reducing food-related emissions. Moreover, by serving as a decision aid, a CO2 label on food can also impact perceived behavioral control, i.e., the perceived ease and self-efficacy of reducing food-related emissions. Last, by influencing individuals' attitudes, perceived social norms, and perceived behavioral control, information on a CO2 label also influences individuals' intention to reduce their diet-related emissions. Hence, I test the following pre-registered (https://doi.org/10.1257/rct.9331-1.0) hypotheses:

**H1**. More information on a retailer's CO2 label for food products influences individuals' market acceptance by …

a.) … increasing the strength of individuals' attitudes,
b.) … influencing individuals' perceived social norms,
c.) … increasing their perceived behavioral control, and
d.) … increasing their consumption intentions regarding reducing the CO2 footprint of their diets.

### 2.2. The effect of promoting a CO2 food label on socio-political acceptance

Climate policy research has shown that socio-political acceptance and climate policy support depend, amongst other factors, on individuals *believing* that climate change is real, which depends on their level of *knowledge* about climate change (Drews & van den Bergh, 2016). Further, from an analysis of the acceptance of renewable energy technologies, Stadelmann-Steffen (2019) found that information (particularly about new technological solutions) can substantially impact citizens' acceptance of the latter. This finding supports the notion that information plays an important role in socio-political acceptance, especially when there is a general lack of knowledge about an issue. Given the general scarcity of knowledge about food-related emissions, especially, easily accessible information in the form of a food label that is highly visible to consumers may be an effective way to increase awareness of food-related emissions, ultimately altering policy support (Lemken et al., 2021). Yet, a CO2 food label needs to be noticed and the information provided by the label needs to be understood for the information to have an effect. This means that the factors (i.e., conciseness, transparency etc.) described in section 2.1 influencing the effectiveness of a label in changing consumption behavior also apply to the policy support context.

Besides identifying the latter effect of more information on support for different food policy instruments, studies have shown that voluntary industry initiatives can also influence the general demand for more governmental regulation. These studies mainly investigate whether voluntary industry initiatives lead to an increase in public demand for government interventions, e.g., through regulation. While some findings and arguments suggest that voluntary initiatives weaken demand for government regulation (Malhotra, Monin, & Tomz, 2019; Werfel, 2017), others argue that the latter can strengthen it, especially when such initiatives are perceived to be broad and relatively unambitious (Fesenfeld et al., 2022; Lemken et al., 2021). Last, the increased salience of an issue (e.g., due to providing information about a CO2 food label and thus raising awareness) can also increase support for policy measures (Fesenfeld et al., 2022, 2023; Lemken et al., 2021). Thus, I test the following pre-registered (https://doi.org/10.1257/rct.9331-1.0) hypotheses:

**H2**. More information on a retailer's CO2 label for food products influences individuals' socio-political acceptance by increasing their support for:

a.) … (government) food policies designed to reduce the climate impact of the food sector.
b.) … more government regulation of the food sector in general.

## 3. Data and methods

The hypotheses were tested using a survey experiment with a representative sample of respondents in the German and French parts of Switzerland fielded between May and June 2022.

As part of the *quantitative survey experimental part of the study*, respondents were randomly assigned to either the control group, which received no additional information, or the treatment group, which was provided with information about the Mcheck label, a voluntary CO2 food labeling initiative by the Swiss retailer Migros (read more on the treatment design in section 3.2). The treatment was designed to closely resemble the information provided about the label by Migros to increase its ecological validity.

### 3.1. Survey sample

Before data collection, approval from the University of Bern ethics board was obtained. After pretesting the survey with a panel of 20 students, an internet panel from a commercial provider of sampling services (Kantar Group, Munich, Germany) was used to recruit the study participants. The respondents were told that they were participating in a *study about food consumption and food product preferences* and received a small financial reward for their participation. Quota sampling was used based on interlocked quotas on gender and age, as well as a quota on the residential canton in Switzerland (Bundesamt für Statistik, 2021) (see Appendix A for details on the screening criteria for survey responses). Forced-choice questions were used throughout the survey to avoid missing values. The final sample consisted of N = 2372 participants (see Appendix A for a priori statistical power analyses). According to a sensitivity analysis, the smallest effect this sample size allows to detect with 80% at $\alpha = 0.05$ is $f^2 = 0.12$, which is considered a small effect size (Cohen, 1988). The demographic and structural composition of the sample corresponds quite closely to the Swiss residential population in the German and French-speaking parts of Switzerland regarding gender and age. However, sample respondents, on average, have a higher-level education, less income, and self-identify as more left on the political spectrum than the average member of the population. A comparison of the sample and population statistics is presented in Appendix B.

### 3.2. Survey procedure and measures

Qualtrics (online survey software application) was used to design the survey experiment and collect the data. Median survey completion time was about 22 min. Participants could choose to answer the survey in German or French. After the screening and the first block of demographic questions, I asked several questions regarding various control variables that have been identified in the food consumption literature as the most relevant predictors of food consumption, food purchasing decisions, and the willingness to pay attention to the CO2 impact of diets. These included questions on: a) the respondent's *diet*, since especially current meat consumption habits have a large impact on the CO2 footprint of diets (Swiss National Science Foundation, 2020; IPES-Food, 2022; Swiss National Science; Willett et al., 2019); b) their *sustainable food shopping criteria (ssc)* to see how much emphasis they put on sustainability criteria such as the environmental and climate impacts of food products (Fesenfeld et al., 2020, 2021); c) their *label opinion* to measure their general perception of food labels; d) their awareness of various food labels used in Swiss supermarkets, including the Mcheck label, to indicate *prior Mcheck awareness* (Kramer & Sucky, 2021); e) their use of a *shopping list* as a proxy for translating purchasing intentions into actual behavior(Kamm et al., 2015); f) their *food shopping behavior*, i.e., their frequency of going food shopping themselves, as a predictor of stronger or weaker involvement in food purchasing (Apostolidis & McLeay, 2016); g) their frequency of visits to supermarkets, including Migros, to check *Migros shopping frequency* and thus the potential frequency of exposure to the Mcheck label; and, h) their *prior knowledge* about the climate impact of food products to help determine their understanding of the impact of food production and consumption on the climate (Hartmann, Lazzarini, Funk, & Siegrist, 2021), amongst other factors – see details on the variables in Appendix B and the detailed question wording in the questionnaire in Appendix H.

The respondents were then randomly assigned to either the control group (no additional information) or the treatment group. The treatment involved exposure to information about the Mcheck label copied from information provided by Migros, followed by an illustrative example of label use. In the information statement, participants in the treatment group were shown a picture of the Mcheck label and told that the following is an excerpt from the information campaign surrounding Migros' new M-Check label.: "*With the M-Check, we want to make sustainable shopping easier for you. We take a close look at our own brands and have them rated by external experts regarding animal welfare and climate compatibility with 1 to 5 stars. With the M-Check on the packaging, you can see immediately how sustainable our products are.*" In addition, they were shown the following illustrative example of the label (see Fig. 1):

After the treatments, I used a seven-point Likert scale to assess the dependent variables of interest, namely, individuals' attitudes, perceived behavioral control, perceived social norms, and behavioral intentions regarding reducing the CO2 footprint of their diets, as well as their intention to support different types of food policies and (in general) more government regulation in the food sector (see Appendix B). To capture individuals' perceived behavioral control, I integrated two questions that measured the perceived ease and self-efficacy of paying attention to climate compatibility when food shopping (as in Sussman & Gifford, 2019). To measure policy support for specific food policies, a selection of demand and supply-side policy measures designed to reduce meat consumption and production were slightly modified from Fesenfeld et al. (2020), who identified the latter based on feedback from nine food governance experts. Additionally, to have another measure of the support of an increased meat tax, the willingness to pay for meat was measured by letting participants increase or decrease the current meat tax in Switzerland using a slider (see Appendix B, Table B1). Finally, as a robustness check for general policy support, I summed the specific support for different policy measures and divided the sum by the number of items to create an additive index for support for policy measures aimed at reducing diet-related CO2 emissions.

As a manipulation check, the respondents were asked to answer questions that revealed their (updated) awareness of the Mcheck label, their attitude towards private labelling initiatives in general, their perception of Migros, and the perceived effectiveness and credibility of private labelling initiatives. They were then asked to answer some short questions to reveal their political ideology, political position, and party support. Finally, the survey concluded with the second block of demographic questions (e.g., income, household size).

### 3.3. Data analysis

The balance checks show that the randomization of the treatment was successful, i.e., the treatment and control groups are very similar regarding standard socio-demographic and economic variables (see Appendix C). To increase the statistical efficiency and robustness of the results, I also included relevant socio-demographic, political, and other control variables (described above) that have been shown to affect food consumption and policy support (see Appendix B) (Stock & Watson, 2020). Hence, the regression models included below with robust standard errors were calculated for each dependent variable. In addition, the second regression model was calculated to exploratively control for the interaction of the survey treatment with prior awareness of the Mcheck label to identify whether having more information about the label prior to undertaking the survey increased the effect of the treatment information on the variables of interest.

$$Y = \beta_0 + \beta_1 * Group + \beta_2 * age + \ldots + \beta_n * control\ variable + \varepsilon \quad (1)$$

$$Y = \beta_0 + \beta_1 * Group + \beta_2 * prior\ Mcheck\ awareness + \beta_3 * (Group * prior\ Mcheck\ awareness) + \beta_4 * age + \ldots + \beta_n * control\ variable + \varepsilon \quad (2)$$

In the regression models, Y stands for the dependent variable, and Group is a factor variable indicating the treatment assignment ("Treatment" or "Control"). Prior Mcheck awareness indicates individuals' familiarity with the Mcheck label prior to the survey treatment with 1 = "not at all familiar" to 7 = "very familiar". Further, additional individual characteristics that have been found to be relevant for food consumption, purchasing behavior, and policy support were added to the regression models, including age, gender, education, the perception of food labels, etc. More details on explanatory and control variables can be found in Appendix B – Table B2.

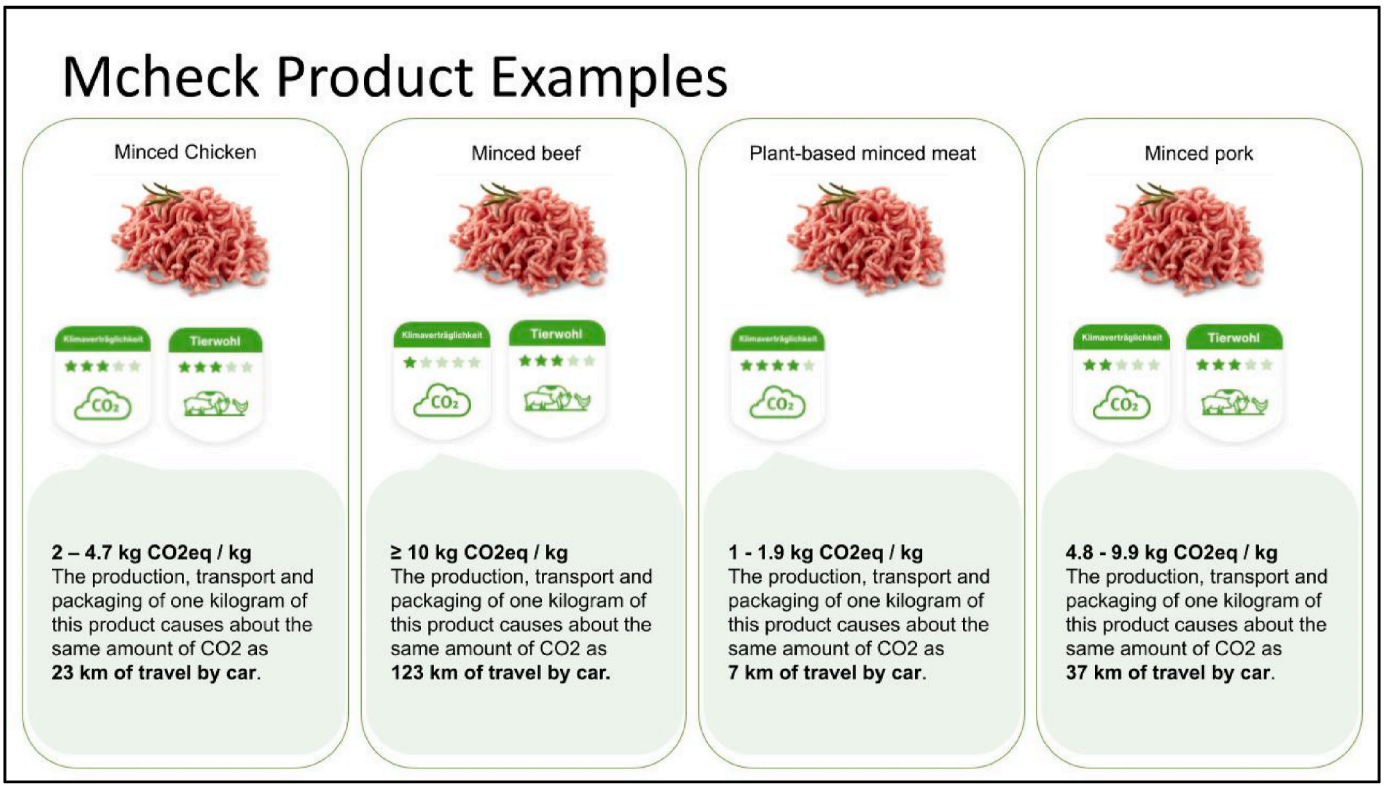


**Fig. 1.** Information treatment part II - An illustrative example of the Mcheck label for respondents in the treatment group. This compares different meat products (chicken – far left, beef – second from left, and pork – far right) with a plant-based meat substitute (second from right) regarding CO2 emissions and the respective Mcheck label climate rating of the products. The animal welfare rating of the meat products was kept constant to focus participants' attention on the climate dimension of the label, while still resembling the label design visible in everyday life. Participants were notified that because the plant-based substitute product did not contain any animal-based ingredients, there was no animal welfare label attached to this product. The CO2 emission ranges related to each product that resulted in the Mcheck label rating were compared to those emitted by a car ride in the accompanying text to enhance participants' understanding of the "CO2 emissions per kilogram" unit of measurement (resembling the information about the Mcheck label rating on the Migros website for individual food products). The original figure was displayed to the participants in German or French, depending on their choice of survey language (see Questionnaire in Appendix H).

Last, for the regression models, Cohen's d (Cohen, 1988) was computed as a measure of the effect size using the empirically derived effect size distributions by Lovakov and Agadullina (2021) to interpret the effect sizes. Moreover, given that several regression models were ran, a p-adjustment was performed for multiple comparisons using the Benjamini and Hochberg (1995) method to control for a false discovery rate.

## 4. Results

The respondents were randomly assigned to either the control or the information treatment group while ensuring relatively equal group sizes. This resulted in N = 1189 participants in the control group and N = 1183 participants in the treatment group.

### 4.1. Experimental results

First, I ran regression model (1) to analyze the main effects of the information treatment on market acceptance (Figs. 2 and 3) and socio-political acceptance (Fig. 4).

The results for the dependent variables measuring *market acceptance* are first presented. Fig. 2 illustrates the main results for the first set of the dependent variables measuring market acceptance.

The results in Fig. 2 illustrate a significant average increase in the strength of individuals' attitudes in the treatment group compared to the control group ($p < 0.001$, 95% CI [0.10, 0.26], $d = -0.14$). Attitudes were measured as the perceived importance of paying attention to climate impact while food shopping. Further, the treatment effect on both the perceived ease ($p < 0.001$, 95% CI [0.11, 0.31], $d = -0.15$) and perceived self-efficacy ($p < 0.01$, 95% CI [0.07, 0.27], $d = -0.12$) of paying attention to the climate impact while food shopping was significantly positive. This indicates that receiving information on an established CO2 label significantly increases individuals' perceived behavioral control regarding diet-related emissions. Last, there is also a significantly positive treatment effect on individuals' food purchasing intentions (i.e., intention to pay attention to the climate footprint of their purchases in the following two weeks) ($p < 0.01$, 95% CI [0.03, 0.21], $d = -0.09$). Overall, the findings support Hypotheses 1a, 1c, and 1d. The significant treatment effects described above range from 0.12 to 0.21 on a seven-point Likert scale. Concerning the results for Cohen's d, the significant treatment effects defined above are very small ($d < |0.15|$), according to Lovakov and Agadullina (2021). The effect size for the treatment effect on individuals' perceived ease of paying attention to the climate impact when food shopping is small ($d = |0.15|$). For more details, see Appendix E – Table E1. When performing the p-adjustment using the Benjamini and Hochberg (1995) method, the above-described effects for attitudes, perceived ease and perceived behavioral control remain significant at the 1% level, the effect for behavioral intentions remains significant at the 5% level.

Fig. 3 presents the main results for the second set of dependent variables measuring market acceptance, i.e., perceived social norms.

The results show a positively significant treatment effect on individuals' perception of social norms among their coworkers concerning paying attention to the climate compatibility of foods ($p < 0.05$, 95% CI [0.02, 0.20], $d = -0.08$). However, for the other social reference groups, i.e., family, friends, and Swiss citizens, there is no significant treatment

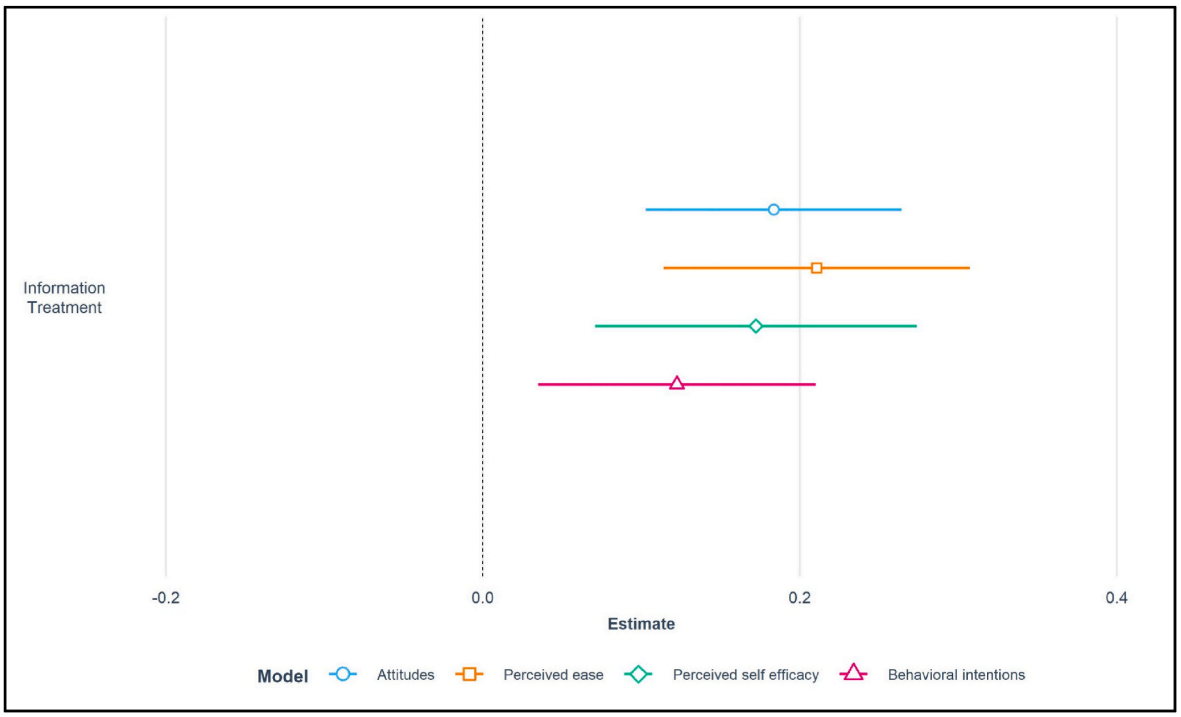


**Fig. 2.** -Main effects on market acceptance – Part 1: The figure outlines the main effects of the information treatment compared to the control group (dashed baseline). In the four different colors, the effects on the other outcome variables (attitudes towards CO2 food labels, perceived ease and self-efficacy of paying attention to climate compatibility, and intention to pay attention to the climate compatibility of foods when shopping) are presented. All outcome variables are measured on a seven-point Likert scale, with higher values indicating stronger intention to change attitude, personal consumption, etc. The error bars represent the 95 percent confidence intervals based on OLS regressions with robust standard errors. The respective regression output tables can be seen in Appendix E. (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

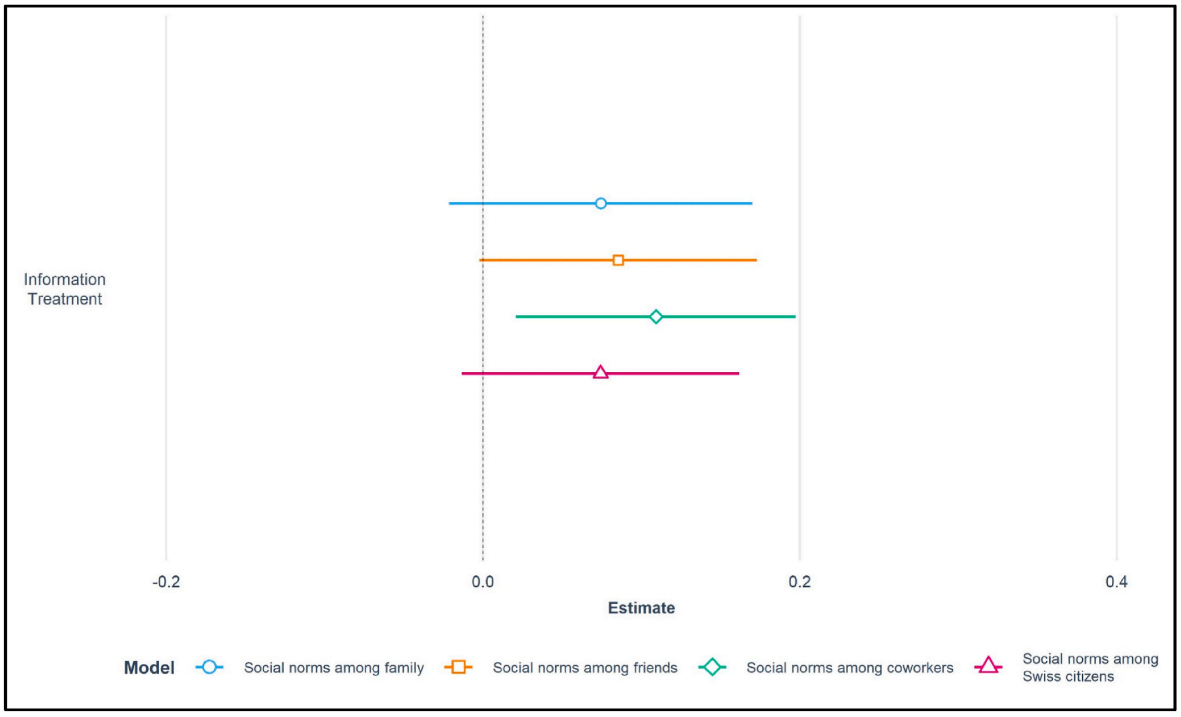


**Fig. 3.** Main effects on market acceptance – Part 2: The figure outlines the main effects of the information treatment compared to the control group (dashed baseline). Effects on the different outcome variables (namely, perceived social norms among family, friends, coworkers, and Swiss citizens) are presented in four colors. All outcome variables are measured on a seven-point Likert scale, with higher values indicating stronger perceived importance of the climate compatibility of food products among family, friends, etc. The error bars represent the 95 percent confidence intervals based on OLS regressions with robust standard errors. The respective regression output tables can be seen in Appendix E. (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

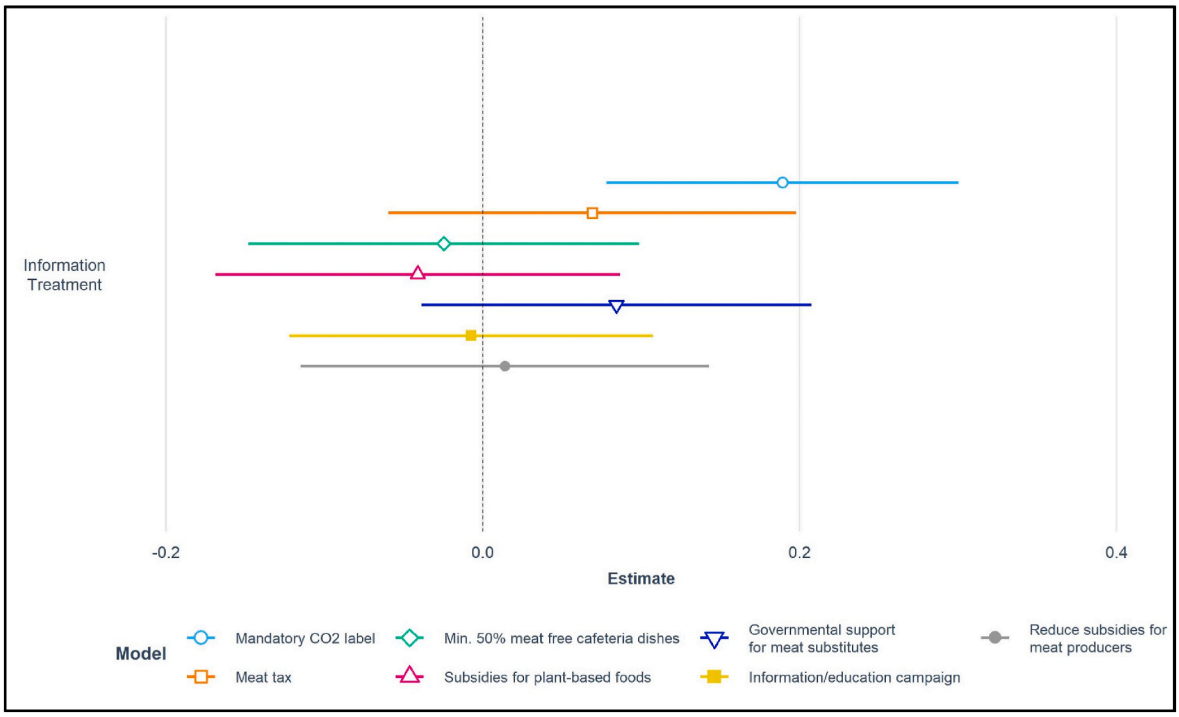


**Fig. 4.** Main effects on socio-political acceptance: The figure outlines the main effects of the information treatment compared to the control group (dashed baseline). In the seven different colors, effects on the other outcome variables (namely, support for a mandatory CO2 label, an increase in tax on meat, a minimum of 50 percent meat-free dishes in cafeterias, subsidies for plant-based foods, government support for meat substitutes, the introduction of an information/education campaign on the climate impact of meat, and a reduction in subsidies for meat producers) are presented. All outcome variables are measured on a seven-point Likert scale, with higher values indicating stronger policy support. The error bars represent the 95 percent confidence intervals based on OLS regressions with robust standard errors. The respective regression output tables can be seen in Appendix E. (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

effect at the 5% significance level. This finding only partially supports Hypothesis 1b. The treatment effect on the perceived social norms among coworkers is 0.11 on a seven-point Likert scale, and the result for Cohen's d shows that the effect size is very small ($d < |0.15|$). For more details, see Appendix E – Table E1. When performing the p-adjustment using the Benjamini and Hochberg (1995) method, the above-described effect for perceived social norms among coworkers remains significant at the 5% level.

Next, the results for the dependent variables that measure *socio-political acceptance* are presented. The treatment has no significant effect on individuals' general support for policy measures for reducing food-related CO2 emissions, nor on individuals' general demand for more governmental regulation in the food sector. Fig. 4 presents results for participants' support for specific food policy measures.

Regarding support for specific policies, there is a significant positive treatment effect on individuals' support for a mandatory CO2 label on food products ($p < 0.001$, 95% CI [0.08, 0.30], $d = -0.12$). In contrast, there is no significant treatment effect on support for other policies, including an increase in tax on meat products and the introduction of a minimum of 50% meat-free dishes in public cafeterias. There is also no significant treatment effect on individuals' willingness to pay for meat by increasing or decreasing the current tax on meat. This indicates that information on a CO2 food label significantly increases specific policy support associated with a mandatory CO2 label for food products, but there are no spillover effects on support for other policy measures, regardless of their stringency. These findings partially support Hypotheses 2a and 2b since the information about a retailer's CO2 food label positively impacts support for a mandatory CO2 label on foods. Moreover, this is a sign that the voluntary initiative can spark demand for more governmental regulation when it comes to this directly related policy measure. However, the hypotheses do not hold regarding the support for other – less directly linked – food policies that aim to reduce diet-related greenhouse gas emissions or general support for more regulation in the food sector. Furthermore, the treatment effect on the support for a mandatory CO2 label is 0.19 on a seven-point Likert scale, with the results for Cohen's d indicating that the effect size is very small ($d < |0.15|$). For more details, see Appendix E. When performing the p-adjustment using the Benjamini and Hochberg (1995) method, the above-described effect for individuals' willingness to support a mandatory CO2 food label remains significant at the 1% level.

Looking at the results of the manipulation check items, the treatment has a significantly positive effect on the perceived impact of food labels, such as the Mcheck label, on individuals' prospective food purchases in the following two weeks ($p < 0.001$, 95% CI [0.13, 0.29], $d = -0.15$). There is also a significant positive effect on individuals' perception of Migros as a company that provides its customers with information on the impact of consumption on people and the environment ($p < 0.001$, 95% CI [0.10, 0.27], $d = -0.15$). However, the treatment does not significantly impact individuals' perception of Migros as a socially and environmentally responsible company or as a company that contributes to creating more sustainable diets. In addition, the information treatment significantly increases individuals' perception of voluntary private food labeling initiatives as effective ($p < 0.01$, 95% CI [0.04, 0.22], $d = -0.10$) and credible ($p < 0.05$, 95% CI [0.02, 0.20], $d = -0.08$) compared to the control group. Last, as intended by the treatment, the treatment has a significantly positive effect on individuals' awareness of and familiarity with the Mcheck label ($p < 0.001$, 95% CI [0.41, 0.60], $d = -0.31$). According to the interpretations of the effect sizes based on Cohen's d, the results for the treatment effects on the perceived credibility and effectiveness of voluntary private food labelling initiatives are very small ($d < |0.15|$), while the rest of the treatment effects above are small ($|0.15| < d < |0.36|$). For more details, see Appendix F.

Finally, I analyzed potential interaction effects between the survey treatment and prior Mcheck awareness by running a second regression

model. I found a significant positive interaction effect between prior Mcheck awareness and the information treatment on individuals' perceived ease of paying attention to the climate impact when food shopping ($p < 0.01$, 95% CI [0.03, 0.13]). This indicates that there are positive synergies between greater prior label awareness and receiving Mcheck information within the survey on individuals' perceived ease of paying attention to their food purchases' climate impact. This supports the notion that being more aware of food-related emissions and the availability of a decision aid, such as a CO2 food label, positively affects individuals' perceived behavioral control. The remaining interaction effects for the other dependent variables are not significant (see Appendix G).

## 5. Discussion

The study examined how information provided on an established CO2 food label influences market acceptance (i.e., consumption intentions) and socio-political acceptance (i.e., policy support). Based on the experimental survey design, the study showed that information on a label can positively impact individuals' attitudes (H1a), perceived behavioral control (H1b), to some extent, perceived social norms (H1c), and behavioral intentions (H1d). This indicates that providing information on retailers' CO2 food labels can increase individuals' awareness of food-related emissions and alter their attitudes toward the label. Further, by raising awareness that a CO2 label on food products is available, individuals perceived behavioral control increases, as indicated by the significant positive treatment effect on the perceived ease and self-efficacy of paying attention to the climate compatibility of food products when shopping. Moreover, there is a positive interaction effect between the prior knowledge on the label and the information treatment on the perceived ease of paying attention to the climate compatibility of foods. This supports literature showing that labels can facilitate climate-friendly purchasing choices (Camilleri et al., 2019; Lemken et al., 2021). However, results for perceived social norms are not as clear, with only the effect of the treatment on perceived social norms among coworkers being significantly positive at the 5% significance level. These findings may be explained by the habitual and normative nature of food consumption behavior, which is not easily changed (Constantino et al., 2022; Hartmann & Siegrist, 2020). More significant effects on perceived social norms may only be visible when more individuals are exposed to such labels and/or information on the climate impact of food consumption over time, such that it becomes part of conversations or relevant social referents in their closer social environment start changing their behavior. In line with the theory of planned behavior, which claims that attitudes, perceived social norms, and perceived behavioral control impact behavioral intentions (Ajzen, 1991; Fishbein, 2008), I find a significantly positive treatment effect on behavioral intentions. Moreover, in the theory, the positive effect on behavioral intentions and perceived behavioral control is assumed to facilitate and positively influence the translation of the intentions into actual purchasing and consumption behavior in the future. Overall, these findings support the first hypotheses (H1a-d) of the study and indicate a positive effect of providing information about a CO2 label on market acceptance. Yet, there are other relevant factors that influence the translation of intentions into behavior identified in the literature, including whether and how goals are set, the origin and motivation behind the intention, the stability of intentions etc. (Sheeran & Webb, 2016) that are beyond the scope of this study but can impact the participants' likelihood of actually reducing the CO2 impact of their food purchases.

Regarding the socio-political acceptance dimension, the study finds mixed results for the effect of information about voluntary CO2 food labels on the support of specific food policies (H2a) and general support for more government regulation in the food sector (H2b). On the one hand, the study finds a significantly positive treatment effect on individuals' intentions to support a mandatory CO2 label on food products. This partly supports the theory that by increasing awareness of food-related emissions, support for sustainable food policies can be increased (Lemken et al., 2021). Further, it is in line with the claims of Fesenfeld et al. (2022) who show that voluntary initiatives can increase demand for government regulation, in this case, the support for a mandatory CO2 food label. Fesenfeld et al. (2022) find that this is especially true when industry initiatives are perceived to be relatively unambitious, which is not the case here, according to the results of the manipulation check. On the contrary, the results show that voluntary labeling initiatives are perceived to be significantly more credible and more effective by individuals in the treatment group compared to the control group. Therefore, the increase in demand for a mandatory label and, thus, more government regulation may instead result from the increased salience of the issue in the treatment group. Accordingly, individuals may be more likely to believe that it is necessary to expand the initiative to other retailers in the country and thus get all food producers to disclose their emissions. Despite the findings of the increase in support for a mandatory CO2 label, there are no significant treatment effects on individuals' general support for policies aimed at reducing the climate impact of the food sector, their general demand for more government regulation in the food sector, or their support for other specific food policies, such as an increase in taxes on meat or subsidies for plant-based foods. This shows that the information about the label and the increase in awareness of the climate impact of food products had no positive spillover effect on support for intrusive food policies and the demand for more governmental regulation in the food sector in general. In contrast to these findings, other studies find that information on the impact of meat consumption can increase policy support for several different instruments, including stricter and more intrusive policies, such as higher taxes on meat products (Fesenfeld et al., 2023). Nevertheless, and very importantly, the results also indicate that there is no crowding out effect on the support for more intrusive food policies. Lastly, increasing the socio-political acceptance of more intrusive policies may also take more time, more frequent exposure to labels, and more information about the climate impact of food products. The findings on socio-political acceptance thus only partly support the second hypothesis (H2a and H2b).

## 6. Conclusion

Overall, from a policy-making perspective, the results suggest that a CO2 label on food products can be effective in terms of market acceptance. Especially when provided with information on an established CO2 food label, consumers attitudes, perceived social norms, behavioral control, and behavioral intentions can be increased towards reducing food related emissions. These intentions may then for some consumers translate into actual changes in consumption behavior since such labels can facilitate climate-friendlier food choices. Yet, although the effects on intentions found are robust, they are relatively small, indicating that the intentions indicated by the respondents in the study may not be stable enough to be translated into significant behavioral changes, which is in line with other studies finding rather modest results (Brunner et al., 2018; Spaargaren et al., 2013). Further, the results also show that there is at least a partial effect of providing information on a CO2 food label on the socio-political acceptance of more food policy measures. More specifically, providing information on a CO2 food label seems to increase awareness of food-related emissions and significantly impacts individuals' support for the mandatory CO2 labelling of food products. This finding indicates that the political feasibility of directly related policy measures, like a mandatory CO2 label, has been increased. However, this effect does not spill over to individuals' support for other food policies. Still, the study results do not suggest that promoting a CO2 food label leads to a crowding out effect on the support of other the food policy measures, since the support for the other measures, except for the mandatory CO2 food label, does not change significantly among the individuals in the treatment group compared to the control group. This finding also contributes to the relevant open debate on whether

voluntary industry initiatives result in an increased (Fesenfeld et al., 2022; Kukowski, Bernecker, et al., 2023) or decreased support (Hagmann, Liao, Chater, & Loewenstein, 2023) of governmental food policies (i.e., crowding in vs. crowding out effects).

The results imply that given the habitual nature of food consumption, policymakers can simultaneously increase awareness of food-related emissions through information and education and introduce a mandatory CO2 food label that provides relevant and concise information to facilitate climate-friendlier food consumption decisions. However, there is a limit to the climate mitigation potential of less intrusive demand-side food policies that rely on individual responsibility, such as information and food labels, which is also indicated by the significant and robust, however, rather small effect sizes in the present study. Therefore, the conditions under which positive spillover effects may occur due to the introduction of less restrictive instruments, such as information and labels, potentially increasing support for more restrictive instruments, such as taxes, needs to be further investigated. Moreover, the potential effects of introducing a mandatory CO2 label on producers' likelihood to reformulate their products is also an important factor that needs to be looked into more.

Further, the results of this study provide important insights into potential pathways for other food system transformation projects and governmental food labeling initiatives, such as the environmental footprint label discussed by the EU. As described above, providing more information about the climate impact of food consumption and promoting a CO2 food label can be used by policymakers to increase individuals' awareness, knowledge about, and familiarity with food-related emissions. Goying beyond the results of this study, this may then over time increase individuals' support for more stringent food policy measures to outsource the reduction of the climate impact of food consumption to the government (as in Kukowski, Bernecker, et al., 2023), especially for those that are aware of the problem and are motivated to reduce their food-related climate impact. Further, increased awareness and information may influence individuals' perceived social norms due to the increased likelihood of people in their closer social environment discussing and being aware of and/or adopting a more climate-friendly diet. Subsequently, given the interrelatedness of individuals' roles as citizens and consumers (Tienhaara et al., 2015), the increase in market acceptance of CO2 food labels due to changes in perceived social norms, attitudes, etc., may alter the socio-political acceptance of more stringent food policy measures. Finally, a CO2 or environmental food label introduced as a mandatory label by the government can also impact retailers and others in the food supply chain to make changes and start offering more climate friendly products over time (Garnett, 2023; Taufique et al., 2022). In that regard, such food labels can have a transformational impact beyond the potentially limited effect on consumer behavior.

Regarding the limitations of this study, it must be noted that food consumption behavior is highly complex and influenced, amongst other things, by habits and social, traditional, and cultural norms (Constantino et al., 2022; Hartmann & Siegrist, 2020; Kukowski, Bernecker, et al., 2023), which may prevent behavioral intentions (such as those impacted by a CO2 label) from being actualized as behavioral changes. Moreover, the present study only measures market acceptance in the form of behavioral intentions and attitudes and not in the form of observed behavioral changes (Nielsen, Cologna, Lange, Brick, & Stern, 2021). Further, the study's ecological validity is limited, since participants are rarely exposed to different types of information as exclusively as in a survey experimental setting, leading to a potential overestimation of the true effects this type of information would have in reality (Lange et al., 2023). Also, consumers are estimated to make around 200 food-related decisions on a daily basis, and information overload may occur if they are asked to pay attention to yet another factor while food shopping (Lemken et al., 2021). Hence, any climate or CO2 label on food products must be easily understandable, transparent, verified by credible external partners, and clearly visible on packaging to reduce the cognitive burden. Furthermore, the design of the Mcheck label does not follow the scientific recommendations about CO2 label design in the EU by Lemken et al. (2021) However, understanding whether individuals really pay attention to the Mcheck label when food shopping and comparing the Mcheck label design with the recommended label design in the literature is beyond the scope of this study. Still, given that the Mcheck label is one of the only larger-scale real-world applications of a CO2 food label, it is an interesting case. Last, the reason for finding no effect of the information treatment on support for other policies, such as taxes, etc., may be due to the treatment being designed to closely resemble the information on the Mcheck label provided by Migros. Providing more information, especially on the climate impact of meat products, may have strengthened the treatment effect (as in Fesenfeld et al., 2023). However, the content of the treatment was intentionally designed to resemble the information provided by Migros in real life to increase the ecological validity of the results.

Several avenues for further research are suggested. The first is analyzing the impact of promoting a CO2 food label on actual purchasing behavior over time. Further, a field experiment that promotes a label by illustrating the better climate score of plant-based products compared to meat products to pinpoint the climate impact of meat consumption could help determine the effect on socio-political acceptance and market acceptance, Last, understanding the conditions that may generate a positive spillover effect of increasing awareness of food-related emissions and introducing less restrictive demand-side policies to the support of more stringent demand-side policies is required. Studies should also investigate the interrelationships among market acceptance socio-political acceptance dimensions.

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## Data availability statement

The dataset generated during and/or analyzed during the current study is available in the Harvard Dataverse public repository: https://doi.org/10.7910/DVN/ASIDPE.

## Code availability statement

The R code used to analyze the dataset for the present study is available in the Harvard Dataverse
Public repository: https://doi.org/10.7910/DVN/ASIDPE.

## Author contributions

Lukas Fesenfeld (project initiator): Funding acquisition, Conceptualization, Methodology. Maiken Maier: Conceptualization, Methodology (both contributed equally to designing the survey and survey embedded experiment), Gathering the data, Formal analysis, Writing – Original Draft, Writing – Review & Editing. Other project members provided feedback and will be involved in further analyses and paper projects as part of the larger project.

## Funding sources

Funding: This work was supported by the Swiss Network for International Studies (SNIS) – (grant number: C21073)

## Declaration of competing interest

The author declares that are no competing interests related to this study. As part of a larger long-term research project in which our project team cooperates with the retailer Migros, in the future we will also get to

analyze the impact of the availability of the Mcheck label, as well as information on the label on anonymized purchasing data. The funding of the larger project that this study is a part of, is independent and not sponsored by Migros (see funding sources indicated above). As part of the cooperation, Migros will use the results of our independent scientific analyses as a source to evaluate their newly launched label (launched as of March 2021).

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jenvp.2023.102216.

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