



How to improve consumers' environmental sustainability judgements of foods



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ABSTRACT

Food production and consumption account for approximately one-third of households' environmental impact. Consumers thus play a major role in the shift towards more sustainable foods and diets. An overall sustainability label or simple guidelines may enable consumers to make more environmentally friendly food choices, but whether such information-based tools improve consumers' ability to choose environmentally sustainable foods has not been empirically investigated. This study's online choice task experiment shows that eco-labels and guidelines marginally increased consumers' accuracy in selecting environmentally friendly foods. Respondents adhered, however, more to guidelines than to eco-labels and led to choices with lower environmental impact. In addition, respondents showed several misconceptions related to the environmental performance of protein products, which were resistant to both eco-labels and guidelines. These findings suggest that new, costly labels may not improve consumers' environmental judgements. Instead, addressing consumers' misconceptions and finding ways to promote environmentally sustainable food purchases is essential.

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1. Introduction

Food production substantially affects the environment and accounts for almost one-third of the environmental impact from household consumption (Tukker et al., 2006). The increasingly intensive food production due to population growth leads to high greenhouse gas emissions (Steinfeld et al., 2006), losses in biodiversity, soil degradation and water stress (Pimentel et al., 1997; Pimentel and Kounang, 1998; Pimentel and Pimentel, 2003). Heating greenhouses, transport, packaging and storage further increase food's environmental impact (Jungbluth et al., 2000; Stoessel et al., 2012). Consumers play an important role in promoting sustainable foods. They drive demand for produced foods and choose from market-available products (Johnston et al., 2014). Thus, dietary changes (e.g., reducing meat consumption) can yield substantial sustainability benefits (Aiking et al., 2006a; Bajzelj et al., 2014; Stehfest et al., 2009). To initiate shifts towards more sustainable food consumption, an in-depth understanding of the drivers for and barriers to change in consumers' food-purchasing

behaviours is needed (Grunert, 2011; Johnston et al., 2014). Research has shown that motivation is an important factor in making sustainable food choices (Grunert et al., 2014; Van Loo et al., 2017). However, consumers also need sufficient knowledge (Peschel et al., 2016) and access to accurate information (Vermeir and Verbeke, 2008).

Governments and researchers concur that providing consumers with comprehensible and comparable information about food's environmental impact is important (European Commission, 2013; Hellweg and Milà i Canals, 2014) to enable them to make informed choices. This information can be conveyed with environmental sustainability labels, but how such labels should be structured and designed is open to debate. It is discussed whether the label should have a footprint or a traffic signal character and whether they should be based on overall environmental impacts or single indicators (Peschel et al., 2016; Schmidt, 2009; Sharp and Wheeler, 2013). Information campaigns (Hanss and Böhm, 2013) and promoting guidelines (Jungbluth et al., 2000; Stoessel et al., 2012) may be viable alternatives to labelling. Whether such labels or guidelines effectively improve consumers' ability to assess the environmental friendliness or impact of foods, however, is an open question.

Therefore, this study examined whether an environmental label

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or guidelines influence consumers' accuracy in choosing more environmentally friendly products.¹ This study thus focused on people's *ability* to choose environmentally sustainable foods rather than their *motivation* to do so. For this purpose, we conducted an online experiment with choice tasks to select the more environmentally sustainable product between several food pairs in three different food categories (protein foods, vegetables and fruits). Respondents were randomly assigned to one of two groups (products with and without organic labels or only conventional products), one of three communication strategies (none, label or guidelines, between subjects) and two food groups (protein products or fruits and vegetables, within subjects).

2. Material and methods

2.1. Selection of products

In real shopping situations, consumers typically choose between products that can be substituted for one another. For example, shoppers would not normally choose between steak and fruit, but rather between chicken and steak for dinner or between an apple and a banana for a snack. To more accurately replicate these grocery decisions, we chose three categories of products within which the products can all be compared to one another and there are vast differences of environmental impact: protein-rich foods (meat, cheese and meat replacements), vegetables and fruits. Some comparisons including different types of products (e.g., meat vs. cheese) might seem unusual in a purchase decision. They however, reflect the comparisons where major reduction of environmental impact can be reached, in contrast to choices within a single product (e.g. different apples). We assumed that for assessing environmental sustainability all the comparisons presented in the choice tasks would be suitable.

Protein foods were chosen because they bear large potential to increase environmental sustainability. Inducing a shift towards lower meat consumption is essential to reduce food's environmental impacts (Jungbluth et al., 2000; Reijnders and Soret, 2003; Stoessel et al., 2012; Westhoek et al., 2014). Also, (partly) replacing animal proteins with plant-based options may positively affect consumers' health (van Dooren et al., 2014). Inducing this change, however, is very challenging (Aiking et al., 2006b; Hartmann and Siegrist, 2017; Springmann et al., 2017).

Vegetables and fruits were included because seasonality and transportation mode considerably influence their environmental impact (Stoessel et al., 2012). Products were selected according to the following criteria: (a) were offered by at least one main retailer in Switzerland during the indicated time frame and (b) covered a wide range of environmental impacts, calculated with Life Cycle Assessment (LCA), within each product category.

In grocery stores, shoppers are confronted with a myriad of different labels related to health, animal husbandry and production practices. Organically labelled foods are very common in Swiss retailers. Studies have shown that consumers generally perceive organic products as healthier, tastier and of higher nutritional quality compared with conventional products (Schleenbecker and Hamm, 2013). This perception might affect consumers' ability to accurately estimate the environmental impact of organic foods. Studies have identified a 'halo effect', which leads consumers to derive positive effects (e.g., healthiness) from traits such as organic or fair-trade production (Schuldt et al., 2012; Sörqvist et al., 2015).

Thus, products labelled as 'organic' might lead consumers to perceive them as more environmentally sustainable than conventional foods, even when this might not be the case (Meier et al., 2015). To explore this issue, we provided half of the respondents with a mix of organic and conventional products to reproduce actual store situations (Group 1); for comparison, the other half of the respondents were provided only with conventional products (Group 2, see Fig. 2). Consequently, whether the accuracy of consumers' environmental assessment is influenced by the presence of organic labels could be evaluated. All products selected for the choice tasks were presented with their respective country of origin and labelling as shown in Table 1.

2.2. Communication strategies

Three communication strategies were tested between subjects in our study: an environmental sustainability label, guidelines and no strategy (i.e., control condition).

2.2.1. Environmental sustainability label

A simple sustainability label could enable consumers to choose more environmentally friendly foods (Reisch et al., 2013). Developing such a label is a challenge, however. A consensus must be reached on what underlying environmental factors should be included on the labels and what standards the labels should meet. The labels must also be precise so that they are easy for consumers to understand. For example, it is unclear whether labels should be comparable for all foods or only within a food category (Leach et al., 2016; Sharp and Wheeler, 2013). Some suggest creating a footprint label showing the extent of a product's impact on a certain environmental domain (e.g., carbon or water footprint) (Peschel et al., 2016; Rööös et al., 2013; Vanclay et al., 2011; Vandenberghe et al., 2011). Others propose a 'traffic signal' label, which divides products into groups of very high, moderate and small environmental impacts (Sharp and Wheeler, 2013; Vanclay et al., 2011). It remains unclear whether these kinds of labels should be based on overall environmental impact, including all environmental effects that emerge along the production chain (Dendler, 2014; Schmidt, 2009), or whether a few single indicators (e.g., greenhouse gas emissions) would sufficiently inform consumers.

In research various efforts have been made to develop overall labels that comprehend various dimensions of sustainability (Engels et al., 2010; Leach et al., 2016; Lukas et al., 2016). In practice single indicator labels, namely greenhouse gas emission, have been introduced in stores (Liu et al., 2016). However, to the best of our knowledge, no standard label that conveys information about overall environmental sustainability is available in stores. Consequently, no established overall sustainability label could be used for our study.

Our goal was to find out if a label indicating the environmental performance of a food product would support consumers in correctly assessing environmental sustainability of foods. In order to support consumers in making informed purchase decisions a label should be easy to understand (Eberle et al., 2011). Therefore, a precise and easy-to-understand logo marking environmentally friendly options (similar to the healthy choice label developed by the Choices Programme [Choices Programme, 2014]) was created for the purpose of this study. The environmentally friendly choice (EFC) label (see Fig. 1 layout) indicated the most environmentally friendly products within each category (protein foods, vegetables and fruits). This led to very obvious solutions for the pairs where one of the two products was marked with an EFC label. However, for the pairs where either both or no product was EFC labelled, the label would not be helpful for determining the more

¹ In this manuscript, the terms 'environmentally friendly' and 'environmentally sustainable' are used interchangeably and refer to food products with lower environmental impact than other products within its product category.

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