Journal of Environmental Psychology 45 (2016) 50–65

Contents lists available at ScienceDirect

Journal of Environmental Psychology

journal homepage: www.elsevier.com/locate/jep

The negative footprint illusion: Perceptual bias in sustainable food consumption

Karen Gorissen*, Bert Weijters

Ghent University, Faculty of Psychology and Educational Sciences, Department of Personnel Management, Work and Organizational Psychology, Henri Dunantlaan 2, B-9000 Ghent, Belgium

ARTICLE INFO

Article history:
Received 6 May 2015
Received in revised form
23 October 2015
Accepted 25 November 2015
Available online 30 November 2015

Keywords:
Negative footprint illusion
Perceptual bias
Green consumption
Eco labels
Organic food

ABSTRACT

The current research introduces the negative footprint illusion: Although adding a green to a non-green food product necessarily increases total environmental impact (footprint), consumers will sometimes erroneously estimate the total environmental impact of the combination of the green and non-green product lower than the same non-green product alone. The negative footprint effect is demonstrated in two between-subjects survey experiments among consumers responsible for purchases in their household (N = 536, N = 580), is partially supported in a student sample (N = 219), but does not show up in a within-subject experiment (N = 477). Our findings contribute to the understanding of how consumers deal with environmental impact information and how such information can be subject to biased processing. We relate our findings to the broader literature on heuristic processing, as well as to the concepts of green-washing and compensatory green beliefs, and draw implications for research and policy making.

1. Introduction

It is by now well accepted that anthropogenic climate change is real and constitutes an immediate threat. Emissions of greenhouse gases (primarily carbon dioxide, methane and nitrous oxide) continue to rise and over the last decades, ocean water has warmed, ice volumes have diminished, and sea levels have risen (IPPC, 2014). These trends can have a detrimental result by affecting the most fundamental determinants of human health: air, water, food, shelter, and freedom from disease (WHO, 2008). Given the urgency of the problem and the required scale of action, the most viable strategy for tackling climate change is to take action on multiple fronts simultaneously (Cohen & Vandenbergh, 2012; IPPC, 2014). One such front is households' food consumption (EU, 2012; Jensen, Denver, & Zanoli, 2011; Rousseau & Vranken, 2013).

Food consumption has a sizeable impact on greenhouse gas emissions (Scialabba & Müller-Lindenlauf, 2010) and shifting consumer choice towards greener options can help in countering climate change (Dietz, Gardner, Gilligan, Stern, & Vandenbergh, 2009; IPPC, 2014; Vandenbergh, Dietz, & Stern, 2011). But despite their growing environmental awareness, consumers do not always engage in greener consumption behavior (Gleim, Smith, Andrews, & Cronin, 2013). Part of the explanation for the gap between awareness and behavior is the uncertainty that consumers experience when evaluating the environmental impact of their choices (Redman & Redman, 2014; Zaccaï, 2007). As pointed out by Zaccaï (2007): "Discriminating between products, to identify those that meet sustainable consumption requirements, demands means of analysis lacking to consumers" (p. 3). Trying to remedy this information deficit, a myriad of certification and labeling systems now aim at helping consumers distinguish green consumption options from other alternatives (Conroy, 2008; also see www.ecolabelindex.com) and there are ongoing efforts to better inform consumers about the sustainability of alternative food consumption behaviors (Siegrist, Visschers, & Hartmann, 2015).

But consumers in developed economies already face overwhelming choice (Gourville & Soman, 2005), and environmental impact is yet another attribute that needs to be evaluated (on top of price, quality, country of origin, packaging volume, price promotions, brand, fair trade labels, etc.). So no matter how well coordinated environmental communication efforts related to food are, their potential contribution to tackling climate change hinges upon the way the environment-related information is processed by consumers. The current research aims to contribute by deepening

* Corresponding author.
E-mail address: Karen.gorissen@ugent.be (K. Gorissen).

http://dx.doi.org/10.1016/j.jenvp.2015.11.009
0272-4944/

our understanding of consumer information processing of environmental impact of food by pointing out a potential perceptual bias. In particular, we introduce the negative footprint illusion: Adding a green to a non-green food product necessarily increases total environmental impact (footprint) given the non-negative carbon footprint of food production (Hillier et al., 2009). But consumers will sometimes erroneously estimate the total environmental impact of the combination of the green and non-green product lower than the same non-green product alone. For example, the negative footprint illusion can result in lower footprint estimates for the combination of a cheese burger with an organic apple than for the same cheese burger alone. This is problematic, as it may paradoxically lead consumers to increase consumption to reduce their footprint.

In what follows, we will discuss literature on consumer health beliefs and biases from which we draw to explain the mechanisms underlying the negative footprint illusion. We then report four survey based experiments and discuss their results. Existence of the negative footprint illusion is supported fully in study 1 and 2, and partially in study 3, all three of which use a between-subjects design, but the negative footprint effect does not show up in study 4, which uses a within-subject design. The illusion appears to be robust to alterations in the way the footprint is measured. To conclude, we discuss implications for theory, relating the effect to the eco-labeling literature as well as the heuristics literature, and implications for practice, relating the negative footprint illusion to other problematic phenomena like green-washing and compensatory green beliefs.

2. Literature review

2.1. Green halos

Recent studies point towards perceptual biases in consumers' processing of environmental information, in particular halo effects, where products that are perceived as ecological are also perceived as better in other ways (even in settings where such differences are ruled out by design and cannot be real). For instance, two identical products can taste differently for consumers when one of them holds an eco-label (Lee, Shimizu, Kniffin, & Wansink, 2013; Sörqvist, Haga, Holmgren, & Hansla, 2015; Sörqvist, Haga, Langeborg, et al., 2015; Sörqvist et al., 2013; Sörqvist & Langeborg, 2015). This effect arises for sensory judgments like taste, as well as for nutrition and value-related judgments: not only does the eco-labeled product taste better than its identical non-labeled alternative, consumers also believe this product is healthier and contains less calories, and they are willing to pay more for the eco-friendly option (Lee et al., 2013; Sörqvist et al., 2013; Wiedmann, Hennigs, Henrik Behrens, & Klarmann, 2014). Apparently, consumers believe ecofriendly products to be superior not only in terms of environmental friendliness, but through a spill-over effect also on other attributes of the product that are not related to the eco-label. The presence of such heuristics based biases in consumer perceptions makes it likely that consumers' estimates of food products' environmental impact will not perfectly map onto objectively quantifiable footprints. This is true especially in light of the fact that consumers seem to have limited factual knowledge about environmental impact of food (Siegrist et al., 2015).

2.2. Negative calorie illusion

In this section, we draw from the literature on health and food choice, and more specifically the bias that may occur when consumers try to estimate caloric content of foods. One research stream in this area shows that when a healthy option is added to an unhealthy one, consumers' perception of the calorie content of the whole decreases, when in reality the total of calories increases (Chernev & Gal, 2010). This misperception is referred to as the negative calorie illusion (Chernev, 2011).

The difficulties experienced by consumers who try to give quantified estimates of caloric food content, relate to the notion that people tend to categorize food into a good versus bad for your health, or virtue versus vice dichotomy (Rozin, Ashmore, & Markwith, 1996). Food options that are consistent with consumers' long-term self-control goals are called virtues. Choosing for virtues can help consumers in achieving their health goals in the future (e.g., losing weight), but does not offer the immediate gratification of a vice (Chernev & Gal, 2010; Wertenbroch, 1998). Vices are food options that are consistent with short-term satisfaction goals (e.g., enjoyment), but are not compatible with the long-term self-control goals (Chernev & Gal, 2010; Wertenbroch, 1998). A salad, for example, consists of vegetables which are perceived as being healthy, and will therefore be classified as a virtue, while a burger is perceived as being indulgent and hence is categorized as a vice.

In their initial demonstration of the negative calorie illusion, Chernev and Gal (2010) explain the illusion as a consequence of the vice-virtue categorization: Based on this categorization, people tend to average the benefits of the combination of vices and virtues, resulting in the believe that the combination of these items is healthier than the unhealthy item, the vice, alone (Chernev & Gal, 2010). For example, the combination of a burger and a salad will be perceived as healthier than the burger alone. People rely on this impression of healthiness to estimate the amount of calories it contains and believe that a healthy meal contains fewer calories than an unhealthy meal (Chandon & Wansink, 2007; Raghunathan, Naylor, & Hoyer, 2006). Therefore, adding a salad to a burger increases the perceived healthiness of the meal and thus decreases the perceived total of calories it contains even though the actual amount of calories logically has increased. This misperception can make people believe that they can decrease the amount of calories by consuming more (Chernev & Gal, 2010).

2.3. The negative footprint illusion

The current research focuses on how consumers process and understand information about products' environmental impact (Grunert, Hieke, & Wills, 2014; Schnell, 2013). More precisely, we operationalize the environmental impact of a product in terms of its carbon footprint, i.e. the greenhouse gas emissions needed to manufacture and transport the product (Weidema, Thrane, Christensen, Schmidt, & Lokke, 2008). Under this operationalization, we make the assumption that even relatively sustainable products have a non-negative footprint (Hillier et al., 2009).

In this context, consumers are faced with the dilemma of individual short-term motives, like price and quality, against collective long-term interests, such as reducing climate change and protecting the environment (Auger, Devinney, Louviere, & Burke, 2008). Based on this dilemma, low-impact products (e.g. an organically labeled apple) can be categorized as virtues. These products are consistent with long-term goals to protect the environment, but may also be perceived as being more expensive (Olson, 2013; van Doorn & Verhoef, 2011). Vices on the other hand are products with a relatively higher impact on the environment (e.g., packaged processed foods from non-organic agriculture) and are consistent with individual short-term motives (like affordability and convenience).

When consumers make a similar vice versus virtue dichotomization in the sustainability context as in the health context, the