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Tailored information helps people progress towards reducing their beef consumption

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ABSTRACT

Stage-based theories of behavior change predict that people should have a different need for information in various stages. We tested this assumption in three studies on reduction of beef consumption on Norwegian samples. An information website was developed providing information on why and how to reduce beef consumption. In Study 1 (N=389), user behavior on this website was analyzed depending on the stage of change. It was found that people try to self-tailor the information, but do not fully succeed. In Study 2 (N=869) and Study 3 (N=3508) a randomized field experiment was conducted, comparing the effect of giving access to the section of the website matching the stage, to a control group with no access, a group with access to all information, and a group with a randomly selected stage-mismatched information. The tailored information outperformed the other conditions significantly. For reduction of beef consumption itself, the results were inconclusive.

1. Introduction

Household consumption has been identified as a major contributor to climate change (Hertwich & Peters, 2009). However, even though the majority of people in western countries perceives climate change as a critical threat and accepts human activities as its cause (Lorenzoni & Pidgeon, 2006), the level of individual action is limited and information campaigns have yielded only minimal effects (Abrahamse, Steg, Vlek, & Rothengatter, 2005). It has been argued that increasing the effectiveness of information aimed at inducing behavior change requires information being tailored to the individuals' need (Abrahamse, Steg, Vlek, & Rothengatter, 2007). In this paper, we argue for tailoring information based on the different psychological steps of behavioral change which have been described in behavior change models. In one of these models, Bamberg (2013b) predicts that in order to change their climate-relevant behavior people need to go through different stages with a particular need for information to match each stage's specific challenges. Information not matching the stage will in the best case be ignored, but might also confuse or irritate people. Based on four studies we analyzed if people select the information they received from a web page designed to reduce their beef consumption based on the stage of change they are in (self-tailoring). Furthermore, we study if providing information tailored to the stage is more successful in getting people to progress through the stages of change comparative to access to information targeting all stages simultaneously, mismatched information, and a no-information control.

1.1. Beef consumption as a high impact behavior

If psychologically motivated environmental campaigns are to be effective, they need to focus on behaviors that have a large environmental impact and at the same time have a high enough psychological plasticity (Dietz, Gardner, Gilligan, Stern, & Vandenbergh, 2009). Individual household consumption directly or indirectly plays a significant role in contributing to climate change and other dimensions of the environmental footprint. Within a household's impact, shelter, transportation, and food are typically the main categories where household decisions can make an important difference (Tukker & Jansen, 2008). Within the food category, the consumption of meat and dairy products is of increased importance (Carlsson-Kanyama, 1998b, 1998a), and especially beef has a high ecological footprint. For this study, we thus focused on beef consumption as an example of behavior that can be targeted with a tailored approach.

Jungbluth, Tietje, and Scholz (2000) argue that a change in food consumption and here especially the reduction of beef and dairy

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products is one of the priority consumer actions to achieve a large environmental benefit with because there are only a few structural barriers to change food choices. Not surprisingly, consumers have been targeted by extensive information campaigns to trigger a change towards more sustainable behavioral patterns, so far without more substantial effects. In Norway, where the studies described in this paper were conducted, reducing beef consumption was highlighted as a key action by politicians and climate researchers in the public debate about consumers' contributions to climate change mitigation. The "three B's" beef (in Norwegian "*biff*"), dwelling (in Norwegian "*bolig*"), and car (in Norwegian "*bil*"), have almost become a symbol of consumer engagement in CO_2 emission reductions. They are used by politicians, researchers and in media (Hirsti, Molde, & Thet Mon, 2014; Holden, 2001). In spite of this broad public discussion, beef consumption is high in Norway, and consumers are largely unaffected by the negative climate impact their consumption has. The Norwegian consumption of meat has increased by the factor 2.16 since the 1950 and reached a peak of 72.0 kg per person per year in 2013; since then it is stable on this level (Helsedirektoratet, 2015). In the last 15 years alone, meat consumption has increased by 21.0%. More than a fourth of Norwegian meat consumption is beef, a significant fraction of that minced beef or meatballs (Matprat, not dated). Even if the societal discussion in Norway has emphasized the role of meat, especially beef, for reducing climate emissions repeatedly, is can be assumed that this does not play a role in everyday dietary decisions. A comparative study in the Netherlands and the US found that only a small fraction of consumers was aware of the outstanding impact that meat and dairy consumption has on the climate (de Boer, de Witt, & Aiking, 2016). Furthermore, this lack of knowledge was stronger for heavy meat-eaters. A recent poll in Nordic countries shows that even if 50% of Norwegians claim that they want to eat climate friendly, willingness to reduce beef consumption is low in Norway as compared to its Scandinavian neighbors and also the belief in reduction of beef consumption as an effective climate measure is lowest in Norway (Keldsen, 2015). Thus, the background for our study is to increase the perceived small impact of beef consumption on climate change and motivate more Norwegians to reduce their beef consumption.

It has been argued previously by several authors, that purely information-based campaigns have small to no effect on people's climate-relevant behavior (Abrahamse et al., 2005; Klöckner, 2015), but more successful intervention strategies are usually resource demanding and difficult to implement on the large scale, which would be mandatory to achieve the necessary reductions to reach the climate and other environmental goals. However, communication through the internet and smartphone applications offers new possibilities in overcoming the main shortcoming of large-scale information campaigns, namely their inability to tailor the information to the needs of the recipient. With this study, we explore the potential that lies in providing people with tailored information, based on a detection of their stage of behavior change. Tailoring can be understood in several ways. On the one hand, tailoring can mean that people are provided with information that they need to manage the task that they are conducting at the moment. In terms of the stage model introduced in the next section, this would mean that people receive the information that they need to successfully answer the questions arising in their particular stage and manage the progression to the next stage. If they for example wonder, which alternatives they have to reduce their beef consumption, a list of alternatives with their advantages and disadvantages would be the information they need. On the other hand, tailored information can also mean that people are provided with persuasive communications adapted to the cues they are receptive to in the stage of change they are in (Latimer et al., 2008; Ludden, van Rompay, Kelders, & van Gemert-Pijnen, 2015). Latimer et al. (2008) for example found that tailoring of information to the regulatory focus (promotion oriented versus prevention-oriented) increased both the exercising intensity and the positive emotional reaction to the training. In line with this, some people in an early stage could, for example, be particularly receptive to information framed towards a health goal, others for information framed towards global justice. This study employs both perspectives on tailoring.

Even though web- or app-based tools have large potential, it should be noted, that studies have shown that such web tools often are used by highly selected groups of people (mostly highly educated women) and that the users often drop out quickly (Ludden et al., 2015). Ludden et al. (2015) studied design features that increase the effectiveness of web-based health or dietary applications and found that the personalization (hence an option of tailoring), ambient information, which means removing the "need to go online" by displaying the relevant information at the point of decision-making, and the use of metaphors to transfer information into storylines that engage were related to more usage and stronger effects. When designing our website, we addressed at least some of their recommendations (see below for a more detailed description). A crucial aspect of web-based communication is certainly to treat people at the right point in time and by the right medium. This point is discussed more when the website and recruitment are presented below and in the general discussion section.

1.2. Behavior change as a process of stages

Already in the early 1990s, health psychologist argued that behavior change – especially of everyday behavior – is not a one-step process, but a series of different steps that need to be taken (Prochaska & DiClemente, 1994; Prochaska, DiClemente, & Norcross, 1992). This way of thinking has more recently been applied to environmental behavior by Bamberg (2007, 2013a, 2013b). Bamberg's stage model of self-regulated behavior change (see Fig. 1) postulates that behavior change follows a series of four stages: (1) the predecision stage, (2) the decision stage, (3) the action stage, and (4) the post-action stage. Each stage has its main challenge that the individual has to address in order to progress to the next stage. A specific intention is formed that marks the transition. These specific intentions are determined by stage-specific predicting variables. In the *predecision stage,* the main question is, "why do I need to act?" The intention marking the transition to the next stage is the goal intention (e.g. "within the next two months I intend to do something about my beef consumption"). Variables facilitating the formation of such an intention are salient social norms, feelings of moral obligation to act, the anticipation of positive emotions when acting or negative emotions when something valuable is lost. In the *decision stage,* the main question is, "what can I do?" Here, a behavioral intention is formed (e.g., "within the next two months I intend to reduce my beef consumption by substituting beef with fish"). Variables influencing this particular intention are attitudes towards the behavioral alternatives in question and the perceived efficacy of implementing them. In the following *action stage,* the main question is, "how do I implement my decision?" In this phase, an implementation intention (e.g., "when I buy groceries tomorrow afternoon I intend to buy fish for dinner") is formed. It is determined by planning abilities and procedural knowledge. The final *post-action stage* is characterized by overcoming relapse and temptations to fall back into old behavioral patterns. Here the main question is, "how do I overcome a potential relapse?" The model does not assume that people proceed linearly through the stages, but rather oscillate back and forth between stages of change. The model has been successfully applied to