



## Analysis

# The complex role of attitudes toward science in pro-environmental consumption in the Nordic countries



Annukka Vainio <sup>a,\*</sup>, Riikka Paloniemi <sup>b</sup>

<sup>a</sup> MTT Agrifood Research Finland (1 January 2015 onwards: Natural Resources Institute Finland), Economics and Social Sciences, Latokartanonkaari 9, FI-00790 Helsinki, Finland

<sup>b</sup> Environmental Policy Centre, Finnish Environment Institute, P.O. Box 140, FI-00251 Helsinki, Finland

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## ABSTRACT

Applying system justification theory, we studied the role of attitudes toward science in pro-environmental consumption among the adult population of the Nordic countries (Denmark, Finland, Iceland, Norway, and Sweden). We analyzed International Social Survey Programme (ISSP) data from 2010 using structural equation modeling (SEM). Attitudes toward science were found to play a complex role in pro-environmental consumption. First, a positive general attitude toward science was indirectly associated with pro-environmental consumption through increased environmental concern and knowledge. Second, the belief that science makes pro-environmental behavior unnecessary was indirectly associated with the avoidance of pro-environmental consumption through reduced environmental concern and knowledge. When these indirect associations were taken into account, a positive general attitude toward science was directly associated with the avoidance of pro-environmental behavior, and the belief that science makes pro-environmental behavior unnecessary was directly associated with increased pro-environmental consumption. The associations between the main variables were similar in all Nordic countries. These results increase our understanding about the ways in which attitudes toward science are related to pro-environmental consumption.

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## 1. Introduction

Science plays an essential yet complex role in the context of environmental problems. The existence of many environmental problems is often first recognized by scientists. In addition, scientists and experts have an important role in suggesting solutions to these problems (e.g., Stern, 2007). On the other hand, many current environmental problems have been either caused or aggravated by scientific and technological innovations. Associated with the complex relationship between science and environmental problems, Schnaiberg (1980, 1994) distinguishes between production science that contributes to the production of goods, and impact science that contributes to human well-being and environmental sustainability. The hope that scientific and technological innovations alone could resolve environmental problems has proven to be too optimistic, not least because many environmental problems are caused by the repeated daily choices made by individual consumers, and thus the resolution of these problems is not simply a matter of science-based political decisions. However, people tend to think that science is responsible for resolving environmental problems (Blok et al., 2008; Buckeley, 2000).

In this article, we examine the role of individuals' attitudes toward science in sustainable consumption. We use the social psychological definition of attitude, namely an individual's evaluation of any particular entity with some degree of favor or disfavor (Bohner and Dickel, 2011; Eagly and Chaiken, 2007). It appears that a highly positive attitude toward science may have an inhibiting effect on individuals' environmental activeness by reducing personal responsibility and concern (Kellstedt et al., 2008). Economists have approached such a phenomenon with the concept of the "crowding out effect", referring to the notion that in certain circumstances external interventions, i.e., monetary incentives or punishments, crowd-out intrinsic motivations and thus decrease the behavior encouraged by incentives (Frey and Jegen, 2001; Vollen, 2008). This issue has been examined by another line of research: it has been investigated experimentally as a matter of coordination failure between stakeholders caused by uncertainty, resulting in inappropriate behavioral outcomes (e.g., Van Huyck et al., 1990). However, there are few studies examining this phenomenon in a non-monetary context, particularly those analyzing the relationship between attitudes toward science and pro-environmental consumption.

In general, a positive attitude toward science has been associated with being male and having a higher level of education, and higher socio-economic status (Einsiedel, 1994; Hayes, 2001; Roberts et al., 2013). Moreover, urban residents usually have a more positive attitude toward science than rural residents (Bak, 2001; Prpić, 2011). Residents of rural areas in particular have been unsatisfied with the way scientific

\* Corresponding author.

E-mail addresses: [annukka.vainio@mtt.fi](mailto:annukka.vainio@mtt.fi) (A. Vainio), [riikka.paloniemi@ymparisto.fi](mailto:riikka.paloniemi@ymparisto.fi) (R. Paloniemi).

experts have claimed universal knowledge of environmental issues and proposed solutions that are insensitive to local circumstances (Wynne, 1992; Yearley, 2000).

In this article, we apply notions deriving from system justification theory (Jost and Banaji, 1994) to test the proposition that sometimes a highly positive attitude toward science reflects a biased – rather than objective – evaluation among consumers. According to this theory, a system justification tendency is a psychological motivation to perceive the current system as fair, legitimate, and beneficial, leading to a desire to maintain and protect the status quo, even at the expense of personal and group interest (Jost and Banaji, 1994; Jost et al., 2002). Cognitive and motivational biases lead individuals to legitimate existing institutions and perceive their outcomes as acceptable and fair (Jost et al., 2003). These biases can be caused by dispositional factors, such as the need for closure and a lack of openness to experience, as well as situational factors, such as a perceived threat to the system (Jost et al., 2007) like those caused by environmental problems (Feygina et al., 2010; Vainio et al., 2014). System justification can be accomplished through the endorsement of certain ideologies, such as right-wing political ideologies that focus on the maintenance of the status quo (Jost and Hunyady, 2005). A system justification tendency can be a significant barrier to pro-environmental consumption because it may interfere with a rational evaluation of environmental risks caused and managed by institutions, leading to a denial of environmental problems and the avoidance of pro-environmental behavior (Feygina et al., 2010; Poortinga et al., 2011; Vainio and Paloniemi, 2013; Vainio et al., 2014).

We integrate the notions deriving from system justification theory with previous findings on the antecedents of pro-environmental behavior. For example, Stern (2000) identifies attitudinal factors (e.g., norms, beliefs, attitudes), personal resources (e.g., knowledge, skills, resources), contextual factors (e.g., social norms and expectations, laws/regulations), and habit as factors affecting pro-environmental behavior. In this study, we examine the associations between attitudes toward science, environmental concern, perceived knowledge and pro-environmental consumption. We also include post-materialist values, place of residence, and other demographic variables known to be associated with pro-environmental consumption. Next, we review previous research associated with the main concepts and research hypotheses of our study, describe the empirical context of the Nordic countries, and then proceed to the empirical study and its findings.

### 1.1. Pro-Environmental Consumption

Pro-environmental consumption has frequently been divided into environmental citizenship behavior, a willingness to make economic sacrifices for the environment, and environmental household behavior (Dietz et al., 1998; Stern et al., 1999; Wakefield et al., 2006). The first two have been categorized as public-sphere behaviors, where environmental citizenship behavior represents more active participation in environmental policies, and a willingness to make economic sacrifices represents citizens' support for public environmental policies. Environmental household behavior represents private-sphere environmental behavior that has relatively direct environmental consequences, whereas public-sphere behaviors have indirect consequences (Stern, 2000).

### 1.2. Environmental Concern and Post-Materialist Values

Environmental concern has usually been defined as a general value orientation toward the environment (Fransson and Gärling, 1999) and it has been found to be an important facilitator of pro-environmental behavior (Wakefield et al., 2006). Some studies have associated environmental concern with economic wealth and the endorsement of post-materialist values (Barr, 2003; Dietz et al., 2007; Inglehart, 1997; Nordlund and Garvill, 2002). According to Inglehart (1997), wealthy countries represent a shift in individual values from materialist values that emphasize economic and physical security to post-material values

that emphasize autonomy, self-expression and quality of life. Increased environmental concern is one of the main products of this post-material socialization among younger generations (Inglehart, 1997; Lyle, 2003). However, Inglehart's post-materialist argument as the main source of environmental concern has been contested by many researchers (cf. Brechin and Kempton, 1994; Dunlap et al., 1993; Grossman and Krueger, 1995), and Inglehart (1995) has also acknowledged that post-materialist values only partially explain environmental concern. Moreover, other studies have shown that increased environmental concern is a global phenomenon that is not associated with wealth (Franzen, 2003).

Despite increased levels of environmental concern, consumers have not exhibited any greater willingness to engage in pro-environmental behavior (Nordlund and Garvill, 2002). This environmental concern-behavior gap has been studied extensively; reasons for it have been considered in terms of demographic variables (e.g., age, gender, education) (Marquart-Pyatt, 2008), psychological variables (e.g., values, predispositions, emotions) (Inglehart, 1997), contextual variables (e.g., exposure to environmental hazards) (Brechin and Kempton, 1994) and social structures (e.g., social networks, political and institutional frameworks) (Gökşen et al., 2002).

### 1.3. Knowledge

According to the “information deficit” model, educating consumers about environmental problems and their solutions would result in positive behavioral changes (Owens, 2000). In this model, consumers fail to make pro-environmental choices because of an information deficit, and the scientific community is assumed to provide objective information about environmental risks to consumers (e.g., Miller, 1983). However, other researchers have criticized the information deficit model arguing that the public is not ignorant and scientific information is not objective (Stilgoe et al., 2005; Wynne, 1992). Since scientific knowledge is increasingly portrayed as uncertain and complex, increasing knowledge of environmental problems does not necessarily lead to increased environmental concern (Kellstedt et al., 2008). Moreover, most researchers agree that only a small fraction of pro-environmental behavior can be directly linked to environmental knowledge and awareness (Kollmuss and Agyeman, 2002).

### 1.4. The Nordic Countries

We focus on the adult population living in the Nordic countries (Denmark, Finland, Iceland, Norway, and Sweden), which are small and relatively wealthy states located in northern Europe. Individuals living in the Nordic countries express a relatively high level of environmental concern, but individual differences are greater than differences between countries (Franzen and Vogl, 2013). Moreover, individuals living in the Nordic countries have a relatively high level of willingness to engage in pro-environmental behavior (European Commission, 2011b).

Individuals living in the Nordic countries have a relatively positive attitude toward science in general, but they also have a positive attitude toward the capacity of scientific innovations to prevent environmental problems (European Commission, 2011a). Therefore, it appears that a positive general attitude toward science co-exists with a specific attitude toward science in managing environmental problems. However, a skeptical attitude toward science in general, as well as toward the view that science can have a role in improving the environment, has become more negative in recent years (European Commission, 2013).

### 1.5. The ISSP

In this study, we analyze International Social Survey Programme (ISSP) data collected between 2010 and 2012. This data were collected from 33 countries and consists of questions associated with

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