Third-Party Certification, Sponsorship and Consumers' Ecolabel Use

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ABSTRACT
While prior ecolabel research suggests that consumers' trust of ecolabel sponsors is associated with their purchase of ecolabeled products, we know little about how third-party certification might relate to consumer purchases when trust varies. Drawing on cognitive theory, and a stratified random sample of more than 1,200 consumers, we assess how third-party certification relates to consumers' use of ecolabels across different program sponsors. We find that consumers' trust of government and environmental NGOs to provide credible environmental information encourages consumers' use of ecolabels sponsored by these entities, and consumers do not differentiate between certified vs. uncertified ecolabels in the presence of trust. By contrast, consumers' distrust of private business to provide credible environmental information discourages their use of business association sponsored ecolabels. However, these ecolabels may be able to overcome consumer distrust if their sponsors certify the ecolabels using third-party auditors. These findings are important to sponsors who wish develop ecolabels that are more credible to consumers, and thus encourage more widespread ecolabel use.

KEY WORDS: ecolabel, environmental label, ecolabel sponsor, consumer perceptions, ecolabel credibility, third-party certification, verification

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INTRODUCTION

Increased global interest in environmental issues (Eurobarometer, 2014) has caused consumers to increasingly consider the environment in their purchasing decisions. Markets have responded by producing more than 450 ecolabels worldwide that are sponsored and administered by government, environmental non-government organizations (NGOs), or business associations (Ecolabel Index 2015). Ecolabels are symbols or seals that are designed to help consumers identify environmentally superior products and services and increase their confidence in making pro-environmental purchases (Tarkiainen and Sundqvist 2005; Nuttavuthisit and Thøgersen 2015).

Despite their increased prevalence, only one in five eco-minded consumers report acting on their environmental preferences by purchasing ecolabeled products (Eurobarometer, 2014). One explanation for consumers' lack of ecolabel use is their skepticism that an ecolabel is a credible signal of a product's superior environmental characteristics (Atkinson and Rosenthal 2014; Dendler, 2014; Nuttvuthisit and Thøgersen 2015). Additionally, consumers appear to be more distrustful of ecolabels sponsored by business associations and therefore are less likely to use them in their purchasing decisions (Darnall, Ponting and Vazquez-Brust 2012). Rather, consumers tend to prefer ecolabels that are developed by sponsors they believe to be more trustworthy, such as a government and environmental NGO (Darnall, et al 2012).

In spite of significant literature discussing the merits of third-party certification (e.g., Delmas and Keller 2005; Potoski and Prakash 2005; Darnall and Sides 2008), what remains unclear is how ecolabel sponsors' use of third-party certification is related to consumer's willingness to purchase ecolabeled products in the presence or absence of trust. Our position is that trust and distrust of ecolabel sponsors act as triggers of consumers' assessments of ecolabel legitimacy, and third-party certification may help untrustworthy sponsors to overcome consumer distrust. Drawing on cognitive theory (Ajzen and Fishbein 1977; Stern 2000; Testa, Iraldo, Vaccari and Ferrari 2015;) and the idea that perceptions and attitudes are critical factors that influence individuals' behavior (Ajzen 1985; Hussain 2000; Stern 2000), we posit that consumers' trust activates a passive mode of information assessment that leads to ecolabel purchase, regardless of whether or not the ecolabel is third-party certified. By contrast, distrust activates an evaluative assessment mode that leads to an ecolabel purchase if the untrustworthy sponsor partners with an independent third-party who certifies that products bearing an ecolabel meet certain environmental standards, thus creating an information cue of the label's legitimacy. Understanding these relationships can help sponsors develop ecolabels that are more credible in the eyes of consumers, thereby encouraging greater product differentiation and widespread ecolabel use, and potentially improving environmental quality.

To examine these relationships empirically, we consider both consumers' reported and intended use of five ecolabels that are sponsored by government, environmental NGOs, and business associations. We draw on survey data for a highly stratified random sample of 1,278 (84.5% response rate) U.K. consumers. We find that consumers who receive environmental information from trustworthy sources (i.e., government, environmental NGOs) are more likely to report purchasing and intending to purchase ecolabeled products. Moreover, third-party certification has little apparent influence on consumers who trust the ecolabel sponsor. However, when environmental information comes from an untrustworthy source, such as a private business, eco-minded consumers do not purchase uncertified products, but do purchase ecolabeled

products that are third-party certified. These findings suggest that in the presence of distrust consumers are more likely to pause and assess information from other sources – such as independent third-party certifications – to arrive at a conclusion about the credibility of that environmental information. Third-party certification therefore appears to serve as an important information cue that enhances the consumers' perceived legitimacy of an ecolabel. These findings contribute to broader discussions about the virtues and limitations of third-party certification (e.g., Delmas and Keller 2005; Potoski and Prakash 2005; Darnall and Sides 2008) in that certification may not increase the legitimacy of certain types of ecolabels.

UNDERSTANDING ECOLABELS

For consumers to determine a product's environmental impact comes with significant search costs (Darnall and Carmin 2005), if the information is available at all. This situation is problematic for consumers who prefer to purchase environmentally conscious products because it can lead to sub-optimal purchasing decisions. It also slows the growth of differentiated green product markets, because firms are reluctant to produce or expand their production of eco-friendly products if there is no market mechanism to differentiate their products from those made by traditional production methods. Ecolabels are information-based policies and programs that are designed to address these sorts of information asymmetries by signaling information to consumers about a product's environmental impact (Cashore 2002; Shen and Saijo 2009; Atkinson and Rosenthal 2014) and reducing consumer uncertainty about the validity of their green purchases (Pedersen and Neergaard 2006; Testa et al, 2015).

Consumers' responses to these market mechanisms indicate in that individuals are often willing to pay a premium for ecolabeled products (e.g., Huang, Kan, and Fu 1999; Ethier, Poe, Schultze and Clark 2000; Loureiro, McCluskey, and Mittelhammer 2001; Bjørner, Hansen, and Russell 2004; O'Brien and Teisl 2004 ; Aguilar and Vlosky 2006). In Europe sales of labeled local food, which travels less than 150 miles from source to table, rose from $4 billion in 2002 to $7 billion in 2011 (O'Rourke 2012). Within the United Kingdom (U.K.), by the end of 2014, 85% of British households had purchased organic products taking total sales of organic-labeled products to 1.86 billion pounds, an increase of 4% compared to 2013 (Soil Association, 2015). Similarly, within the United States (U.S.), sales of organic food products increased from $3.6 billion in 1997 to $39 billion in 2014 (Organic Trade Association 2015), and U.S. consumers spent 20 - 100% more for organic labeled food (Valliant 2014). Moreover, procurement officers within federal agencies are increasingly being asked to consider the environmental attributes of their purchases (Testa, Iraldo, Frey and Daddi, 2012), and ecolabels are one mechanism for them to do so.

However, not all ecolabels are designed similarly and they tend to vary along at least two important design dimensions: who sponsors the ecolabel and the manner in which the ecolabel is monitored and confirmed. Related to their sponsorship, ecolabels are usually sponsored by governments, environmental NGOs, and business associations (Darnall, Potoski, and Prakash 2010). Government sponsors, in general, are tasked with protecting customers against excessive industrial pollution by establishing environmental policies and monitoring business compliance with these policies. Similarly, environmental NGOs serve as societal watchdogs that monitor corporate pollution and use the media to expose information about firms' environmental misdeeds. Even though government and NGOs take different strategies toward achieving their organizational mission, their goals are similar in that they strive to inform consumers about businesses' environmental impacts and protect the natural environment. By contrast, business associations' primary mission is to promote the economic interest of member firms. This interest

is sometimes at odds with environmental protection since private business is criticized for its significant role in generating pollution (Dietz and Vollebergh 1999) and is scrutinized for misinforming customers about their environmental performance (Hussain 2000; Testa et al. 2015). These factors have raised issues of trust related to business associations being credible information sources.

Related to the manner in which ecolabels are monitored and confirmed, many sponsors take a primary role in verifying conformance to their ecolabel standards. This process is referred to as second party verification. When nonconformances are detected, sponsors of second party verified ecolabels typically informs the business so that product adjustments can be made to create alignment with ecolabel standards (Catska and Corbett, 2014). Other ecolabel sponsors go beyond second party verification and utilize third-party certification to obtain evidence and determine the extent to which ecolabel criteria are fulfilled (Deaton 2004; Starobin and Weinthal 2010; Eisend and Küster 2011; Atkinson and Rosenthal 2014; Catska and Corbett 2014). Third-party certification involves reliance on an independent outside auditor to monitor and confirm conformance to ecolabel requirements. In instances where a nonconformance is discovered, the independent outside auditor typically informs the business so that it can modify its product conform to ecolabel standards (Catska and Corbett, 2014). Once the product conforms to the ecolabel standard, it may receive third-party certification, which helps increase the legitimacy (Delmas and Keller 2005; Potoski and Prakash 2005; Darnall and Sides 2008) and trust of the ecolabeled product (Schepers, 2010; Janssen and Hamm 2012).

While prior studies discuss the merits of third-party certification towards enhancing legitimacy (e.g., Delmas and Keller 2005; Potoski and Prakash 2005; Darnall and Sides 2008), we have very little understanding about how ecolabel sponsors' use of third-party certification relates to consumer's willingness to purchase ecolabeled products. Legitimacy within this setting refers to consumers' perception that an ecolabel adheres to social expectations, norms and values (Finch, Deephouse and Varella. 2015), and is one of the most important conditions for an ecolabel to be successful (Dendler, 2014). We draw on planned behavior theory (Ajzen and Fishbein 1977; Ajzen 1985) and attitude-behavior-context (ABC) theory (Stern, 2000) to suggest that individuals' trust or distrust of different ecolabel sponsors, their consequent cognitive information processes (i.e., Tost 2011; Finch et al. 2015;), and third-party certification have a strong role in explaining when consumers purchase ecolabeled products..

CONSUMER TRUST OF ECOLABEL SPONSORS AND THIRD-PARTY CERTIFICATION

Planned behavior theory is arguably the most influential theory that rationalizes pro-social behavior (Pavlou and Fygenson, 2006). According to the theory, individual behaviors are predicted by their intentions, which are a function of the attitudes towards the behavior and subjective norms (or perceived social pressure) (Ajzen and Fishbein 1977; Ajzen 1985). Individual behaviors are also a function of perceived behavioral control (or an individual's perceived ease or difficulty of performing a behavior) (Ajzen and Fishbein 1977; Ajzen 1985). In further developing these issues, Stern's (2000) attitude-behavior-context theory rationalizes individuals' environmental behaviors. He suggests that individuals' environmental behaviors, while strongly influenced by their affections and beliefs, are socially motivated and moderated by contextual factors.

Consumers' trust in an information source conceptually links the predictors of intentions discussed in planned behavior theory and how these predictors are moderated by contextual

factors as discussed in attitude-behavior-context theory. Trust elicits both cognitive and affective responses in individuals (Fukuyama, 1995). Trust in an information source is a powerful antecedent of individuals' attitudes, perceived behavioral control and social norms influencing customers information-seeking behavior and purchasing behavior (Pavlou and Fygenson, 2006; Aertsens, Verbeke, Mandelaers and Van Huylenbroeck 2009). Trust influences normative beliefs (antecedent of social norms) since people tend to behave to please people they trust, as well as attitudinal beliefs (antecedents of attitudes) since individuals accept the information about outcomes provided by trusted sources. Finally, trust influences control beliefs (antecedents of perceived behavioral control) because trust reduces social uncertainty and makes individuals feel more in control of their actions (Pavlou and Fygenson, 2006).

In the presence of trust, individuals tend to conserve cognitive energy in their decision-making processes (Kahneman and Frederick 2002; Doherty, Campbell, Hynes and van Rensburg, 2013) by passively assessing information (Tost 2011). In the *passive mode*, an individual does not engage in rigorous evaluation. Instead, he/she relies on cognitive shortcuts (Tost 2011) to determine whether an entity is adhering to a socially constructed system of norms, values, beliefs, and definitions and therefore is legitimate (Suchman 1995). Individuals who trust information sources therefore deem an entity to be legitimate and are more willing to accept that entity's message without the need for undertaking extensive assessment of the message (Finch et al. 2015), which can lead to an automatic purchase of a new product (Aertsens et al, 2009).

Applied to ecolabel sponsors, given that the organizational mission of government and environmental NGOs is to protect the natural environment, consumers are more likely to regard both entities as credible sources, and thereby trust the environmental information they provide (Darnall et al 2012). This trust is likely to extend to the ecolabels which these organizations sponsor (Darnall et al 2012). Additionally, these sponsors can penalize businesses that fail to follow ecolabel standards by restricting their access to the logo. For these reasons, consumers who trust government and NGOs as environmental information providers are more likely to utilize a passive mode of information assessment and perceive the ecolabels that are sponsored by these entities as being legitimate and credible. In the presence of trust, they are more likely to have a favorable attitude (Ajzen and Fishbein 1977; Pornpitakpan 2004) towards purchasing ecolabeled products sponsored by these entities, and therefore have fewer reasons to seek additional information to determine whether or not these sponsors' ecolabels conform to societal expectations compared to second party verified labels. Third-party certification therefore may not serve as a critical information cue that informs their purchasing decision.

Hypothesis 1: Consumers who trust government and environmental NGOs to provide credible environmental information are more likely to utilize ecolabels sponsored by these entities regardless of whether the ecolabels are third-party certified or second party verified.

By contrast, an individual's distrust of an information source causes them to expend cognitive energy in decision making and utilize an *evaluative mode* of information assessment (Thøgersen et al 2010; Eisend and Küster 2011). In an evaluative assessment mode, individuals are actively engaged in information processing to determine whether an entity is trustworthy (Tost 2011). In such circumstances, individuals question whether the entity conforms to social expectations (Tost 2011). If not, they develop negative cognitions toward that source (Hussain 2000; Van Dan and De Jonge 2015) and are resistant towards acting on information provided by that source (Hussain 2000; Van Dan and De Jonge 2015) because of lack of trust. Some individuals seek other information cues (from more trustworthy sources) to help confirm or dismiss the

untrustworthy entity's message (Jiang, Jones and Javie 2008).

Applied to the ecolabel setting, consumers are more likely to regard private business as a less trustworthy source of environmental information (Darnall et al 2012). Private business is criticized for its significant role in generating pollution (Dietz and Vollebergh 1999) and is scrutinized for misinforming customers about its environmental performance (Hussain 2000; Testa et al. 2015). Indeed, many consumers indicate that they believe that businesses "do not tell the whole story" when they provide environmental information (Oates, McDonald, Alevizou, Hwang, Young, and McMorland 2008). Consumers also believe that businesses tend to make false environmental claims (Banerjee and Solomon 2003; Atkinson and Rosenthal 2014) and exaggerate their environmental advertising (Carlson, Grove, and Kangun 1993; Scammon and Mayer 1995). For instance, by 2013, only about half (52%) of EU citizens reported that they generally trusted business' claims about the environmental performance of their products (Eurobarometer 2013). Misinformation about firms' environmental activities persists because of society's burgeoning interest in environmental issues (Bowen 2014; Darnall and Aragón-Correa 2014), coupled with insufficient market incentives that deter businesses from creating the appearance that their products are more environmentally friendly, when in fact they are not.

Given the general concern about business providing credible environmental information, it would be easy to conclude that consumers would be less likely to utilize ecolabels that are sponsored by business associations. However, individuals who distrust business-sponsored ecolabels may be willing to seek information cues to help confirm or dismiss the legitimacy of business-sponsored ecolabels (Schepers 2010; Starobin and Weinthal 2010; Janssen and Hamm 2012; Atkinson and Rosenthal 2014). We posit that third-party certification may serve as that information cue and it is particularly useful at addressing consumers' negative cognitions. Certification can enhance consumers' attitudes towards the perceived legitimacy of information (Schepers, 2010) and their willingness to act on it because third-party auditors are independent of the business and the ecolabel sponsor. Consumers therefore are more likely to trust them (Jiang et al., 2008), thus increasing their confidence in the ecolabel's legitimacy (Janssen and Hamm 2012) and willingness to purchase business association sponsored ecolabels.

Hypothesis 2a: *Consumers who distrust business to provide environmental information are more likely to utilize an ecolabel sponsored by a business association if the ecolabel is third-party certified.*

In the absence of third-party certification, we suggest that consumers who distrust private business to provide environmental information are more likely to dismiss the legitimacy of business-sponsored ecolabels and are no more likely to utilize them.

Hypothesis 2b: *Consumers who distrust business to provide environmental information are no more likely to utilize an ecolabel sponsored by a business association if the ecolabel is second party verified.*

Figure 1 summarizes the relationships that form our hypotheses. It illustrates how consumers' trust related to their ecolabel use.

—INSERT FIGURE 1 ABOUT HERE—
METHODS

To assess our relationships of interest, we relied on a unique set of data collected by The Future Foundation, a consumer strategy company, and Cardiff University's Centre for Business Relationships, Accountability, Sustainability and Society (BRASS). The data were collected from a U.K. (England, Ireland, Scotland, and Wales) survey, which assessed consumers' perceptions related to their existing ecolabel use, their intent to use ecolabels in their future

purchases, and their trust of environmental information sources. Other parts of the survey inquired about consumers' knowledge of environmental issues, perceived personal risk related to environmental concerns, and sense of empowerment to address environmental concerns, in addition to a variety of demographic factors. Survey developers selected climate change as the preferred environmental application because in recent years it has received significant public attention, and because the Intergovernmental Panel on Climate Change recognized it as being the most pressing environmental problem affecting the global environment (IPCC 2010).

At the time of the survey, the U.K. had approximately 60 million residents. The sample was restricted to consumers who had Internet access and who were 16 years of age or older. This restriction limited the sample to 38 million residents, or 63% of the U.K. population. Survey developers enlisted the assistance of *Research Now*, a nationally recognized U.K. market research firm, to assist with finalizing the sample to ensure representativeness. While limited to Internet users, the sample was statistically representative with respect to a variety of demographic characteristics in that individuals were stratified across 12 characteristics: age, household income, gender, region, terminal education age, postcode, car ownership, personal income, household tenure, number of children, working status, and number of adults in the household. Stratification yielded 400,000 U.K. consumers, 1,513 of whom were then randomly sampled, and asked to complete an online survey about their environmental behaviors. To increase response rates, and to help ensure more thoughtful responses, consumers were offered a financial incentive. A total of 1,278 (84.5%) of target U.K. consumers completed the survey.

Two approaches were used to address common method bias (CMB) related to variance that is attributable to the measurement method rather than to the constructs the measures represent (Podsakoff, MacKenzie, Lee, and Podsakoff 2003). First, Future Foundation and BRASS utilized procedural remedies. These remedies are implemented during survey design and administration. One such approach was to ensure anonymity and confidentiality of the study (Chang et al., 2010; Podsakoff et al., 2003), which helps reduce respondents' tendency to respond to surveys in a socially desirable way, thus increasing confidence in their responses (Podsakoff et al., 2003). To engage respondents to a greater degree, survey designers also varied response formats and scales to reduce anchoring bias caused by commonalities in scale endpoints (Podsakoff et al., 2003 Chang et al., 2010). Response scales and formats included dichotomous scales, Likert scales, open-ended responses, and multiple responses. To further reduce the probability of CMB, survey designers separated the measurement of the dependent variable from the measurement of the explanatory variables (Podsakoff et al., 2003). Questions related to consumers' trust of environmental information were asked on pages 10–11 and were separated from questions about overall reported ecolabel use (page 14) and consumers' intentions to use ecolabeled products (pages 16–22). Consequently, respondents were less likely to perceive that certain measures were related and edit their responses in a way that was consistent with cognitive expectations (Chang et al., 2003).

Our second approach to addressing CMB was to use ex-post statistical analyses. To assess CMB, we examined the survey data using Harman's single-factor post-hoc test (Podsakoff and Organ 1986). This procedure involves an explanatory factor analysis of all items, and if a single factor emerges accounting for the majority of the covariation between the dependent and independent variables then CMB is a concern (Podsakoff and Organ, 1986). After executing this test, we found no evidence that common method variance was a concern. Future Foundation and BRASS did not examine non-response bias by comparing early to late responders, and this is a limitation of our study. However, Future Foundation did evaluate the general distribution of its

survey respondents and determined that they did not differ statistically from the general U.K. population across the 12 demographic characteristics mentioned earlier.

Measures

Dependent Variable. We measure ecolabel use in two ways, the first of which assesses consumers' reported overall ecolabel impact on their purchasing decisions. This approach is consistent with that of most research on information-based policies, which also relies on self-reported information. For instance, researchers (e.g., Delmas and Keller 2005) assessing the efficacy of EPA's Waste Wise Program have relied on data related to firms' self-reported municipal wastes. Similarly, EPA's Toxic Release Inventory is a database comprised of facilities' self-reported toxic chemicals that are released and transferred within their operational boundaries, and is the primary source used by researchers (e.g., Arora and Cason 1995; Gamper-Rabindran 2006) who are interested in learning how information-based policies relate to facilities' toxic releases. Internationalized studies examining the implications of information-based policies (e.g., Johnstone 2007) also utilize self-reported survey data to arrive at their conclusions.

To measure consumers' *overall ecolabel impact on purchasing decisions*, we relied on a survey question that asked consumers to "Please indicate whether you agree or disagree with the following statement: Ecolabels have *no impact* on my decision to buy products." Consumers indicated whether they "Strongly disagreed"=1 "Somewhat disagreed"=2, "Neither agreed nor disagreed"=3, "Somewhat agreed"=4, or "Strongly agreed"=5. Responses were then reverse-coded such that higher values accounted for ecolabels having greater impact on consumers' decisions to purchase products.

Our second measure of consumers' ecolabel use accounted for their stated *intention to purchase* ecolabeled products. In arriving at this measure, we drew on research by Shepphard Hartwick, and Warshaw (1988). In their meta-analysis of 87 studies, they determined that consumer choice (not specifically related to ecolabels) had a high degree of correlation between consumers' intention to purchase and subsequent behavior. This correlation is consistent with cognitive theories (e.g., Ajzen 1985) suggesting that individuals' stated intention to act is a strong predictor of future action. To measure consumers' intention to purchase ecolabeled products, consumers were presented with images of 5 different U.K. ecolabels (EU Energy Rating label, European Eco Flower[1], Forest Stewardship Council, Mobius Loop, and Soil Association Organic Standard), see Table 1. These labels were selected because they were widely available across the U.K. Moreover, these ecolabels were not sponsored by a specific company, and thus appealed to a wide array of producers and products.

Because they were prevalent in the market since at least 1995, we expected that these labels were more likely to be recognized by consumers than other labels (e.g., Carbon Trust) that had been developed more recently. The EU Energy Rating label and the Mobius Loop were both second party verified labels and sponsored by government and business associations, respectively. European Eco Flower, Forest Stewardship Council, and Soil Association Organic Standard were all third-party certified labels and sponsored by a government, environmental NGO, and business association, respectively. After viewing each image, consumers were asked, "with this knowledge to what extent will it influence your in-store decisions if you saw this label on a product or service?" Survey respondents reported whether they were "Very likely"=5, "Somewhat likely"=4, or "Neither unlikely nor likely"=3, "Somewhat unlikely"=2, or "Very unlikely"=1. This measure produced five estimates (one for each ecolabel) associated with consumers' stated intention to purchase ecolabeled products.

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[1] The European Eco Flower is now known as the EU Ecolabel.

—INSERT TABLE 1 ABOUT HERE—

Independent Variables. To assess consumers' trust of government to provide environmental information, consumers were asked, "How much do you trust your local authority, U.K. government, and the European Commission, to provide you with credible information on climate change?" For each government entity, consumers indicated, "No trust at all"=1, "Little trust"=2, "Neither"=3, "Trust a little"=4, or "Trust wholly"=5. The three government variables were entered into a common factor analysis. Cronbach's alpha (0.846), which measures the internal consistency of our index, was above Nunnally's (1978) recommended value of 0.70. One factor emerged to account for government trust, as seen in Table 2. Consumers were also asked the same question related to their trust of environmental NGOs and their trust of private-sector companies.

—INSERT TABLE 2 ABOUT HERE—

Control Variables. Knowledge affects individuals' motivation to act in an environmentally friendly way (Jackson 2005; Bamberg and Moser 2007; Moisander 2007), and is a driver of personal responsibility (Moisander 2007). To control for individuals' environmental knowledge, we consider two types of knowledge—general and action-based. General environmental knowledge involves a broad awareness of basic terminology and concepts (Darnall et al 2012). Action-based knowledge relates to consumers' understanding of the activities required to mitigate environmental problems (Darnall et al 2012). It includes an awareness of how individuals' actions impact the environment and how other actions can mitigate this behavior (Hines, Hungerford, and Tomera 1986/87). We relied on one survey question to measure both types of environmental knowledge. It asked, "How familiar are you with each of the following terms?" The general-knowledge terms were "climate change" and "carbon or CO_2 emissions," whereas action-knowledge terms were "carbon offsetting" and "carbon labeling." For each of the items, respondents indicated whether they "Have never heard of it" =1, "Have heard of it but don't know anything about it"=2, "Know a little about it"=3, "Know a fair amount about it"=4, or "Know a lot about it"=5. All four items were entered into a common factor analysis. Two factors accounted for general and action-based knowledge (Cronbach's alpha = 0.992, 0.779, respectively), as seen in Table 3, and both had internal consistency measures above Nunnally's (1978) recommended 0.70 value.

—INSERT TABLE 3 ABOUT HERE—

We also accounted for consumers' sense of personal risk toward climate change. Sense of personal risk has been shown to be related with pro-environmental behaviors that include household energy saving (Black, Stern, and Elworth 1985), recycling (Vining and Ebreo 1991, 1992), and less private car use (Bamberg and Schmidt 2003). We controlled for it by relying on a question in the survey that asked, "To what extent do you feel that you will be personally affected by climate change?" Respondents indicated whether they thought: "I don't feel worried as I don't believe climate change is happening"=1, "Climate change is not happening yet, but my grandchildren will experience the effects of it in their lifetime"=2, "Climate change is not happening yet, and I don't think I will see the effects of it in my lifetime"=3, "Climate change is not happening yet, but I think I will see the effects of it in my lifetime"=4, or "I do feel at risk from climate change: it is happening now and we should do more to prevent it"=5.

Consumers who perceive a sense of empowerment toward environmental concerns believe that their personal actions affect their surroundings, and therefore are more likely to act to mitigate those concerns (Black et al 1985; Hines et al 1986/87). To account for consumers' sense of empowerment, we drew on a survey question that asked consumers, "Please indicate whether

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you agree or disagree with the following statement." Consumers were presented with the following declaration: "There is no point in trying to reduce emissions at an individual level." Respondents indicated whether for each of these statements that they "Strongly disagreed" =1, "Somewhat disagreed"=2, "Neither agreed nor disagreed"=3, "Somewhat agreed"=4, or "Strongly agreed"=5.

We controlled for consumers' education, since prior research suggests that more educated individuals are more likely to trust ecolabels (Noblet, Teisl, and Rubin 2006). Additionally, since individuals' environmental concern might increase in homes with children, we accounted for respondents' number of children at home. We also controlled for respondents' household income because social consciousness typically increases with income (Huang, Kan, and Fu 1999). Finally, we accounted for respondents' gender (Huang 1993; Laroche, Bergeron, and Barbaro-Forleo 2001), age (Lee 2008), and U.K. country of residence. England was our reference country dummy.

Empirical Models

Table 4 includes descriptive statistics and correlations for the variables included in our analysis. Variance inflation factors (VIF) for each of our explanatory variables (< 1.93) were below Kennedy's (2003) maximum acceptable threshold of 10.0, indicating that multicollinearity was not a concern.

—INSERT TABLE 4 ABOUT HERE—

Because of the scaled nature of our dependent variable, an ordinal logistical regression appeared suitable. However, when we used Brant's test to examine the proportional odds assumption (Menard 2002), our data failed the test. Standard advice in such situations is to use a multinomial logit (Agresti 2010). However, such a model would be difficult to interpret given that we were assessing six models (one measuring overall ecolabel use and five estimating consumers' intention to use specific ecolabels), and each of these measures consisted of five categorical options. Our results therefore would yield 30 different comparisons, which would be problematic for interpretation. Recognizing that distinctions between the extent to which consumers are "somewhat unlikely" as opposed to being "very unlikely" to be influenced by knowledge of an ecolabel were less relevant for our purposes, we undertook a more parsimonious approach by using logistic regression to assess the relationship between consumer trust and their ecolabel use. For the first measure of our dependent variable, *overall ecolabel impact on purchasing decision*, we combined consumers who indicated they "Strongly agreed" with those that "Agreed"=1 that ecolabels impact their decision to buy products. We then combined those that "Neither agreed nor disagreed," "Somewhat disagreed," and "Strongly disagreed"=0. Similarly, to assess consumers' *inclination towards ecolabel use*, survey respondents who reported they were "Very likely" and "Somewhat likely"=1 were combined, as were consumers who reported "Neither unlikely nor likely," "Somewhat unlikely," and "Very unlikely,"=0. Model significance was determined by evaluating the likelihood ratio chi-square values for each of the models. To examine the robustness of our estimations, we also estimated our models by changing our dependent variable such that "Neither agreed nor disagreed" was recoded (from 0 to 1) and by using linear regression. Related to the latter, since the linearity assumption was violated with our categorical dependent variables, we placed greater emphasis on our logistic regression results.

We anticipated finding likelihood ratios that were statistically greater than 1.0 when examining the relationship between perceived trust of government and environmental NGOs to provide credible environmental information and ecolabel use. By contrast, likelihood ratios

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related to consumers' trust of private business to provide credible environmental information were expected to be less than 1.0, signifying an inverse relationship between consumers' trust of private business to provide credible environmental information and their likelihood to use government sponsored, environmental NGO sponsored, and business sponsored ecolabels. Statistical analyses were performed using Stata 11.

RESULTS

The results of our logistic regression models (see Table 5) show that the likelihood ratio test statistics (-821.10 to -709.92) were significant ($p< 0.01$) for all 6 estimation models, indicating that the null effect of the independent variables could be rejected. Pseudo R-squares for our six models ranged from 11.8% to 28.9%, with an average of 21.9%.

—INSERT TABLE 5 ABOUT HERE—

Estimations of the relationship between consumers' trust of different institutions to provide environmental information and their reported ecolabel use indicate that trust of government was positive and statistically significant ($p<.01$) across all 6 models, as was trust of environmental NGOs ($p<.01$). More specifically, consumers who reported a greater trust of government to provide credible environmental information were 31% (1.31 minus 1.00) more likely to report using ecolabels in their purchasing decisions. Additionally, consumers who reported a greater trust of government to provide credible environmental information also reported being between 31% and 58% more inclined to use the EU Energy Rating label, EU Eco Flower, and Forest Stewardship Council label in their in-store decisions if they saw these labels on a product.

Related to environmental NGOs, consumers who reported a greater trust of environmental NGOs to provide credible information were 18% more likely ($p<.01$) to use ecolabels than consumers who reported less trust of environmental NGOs. Additionally, consumers who reported a greater trust of environmental NGOs to provide credible environmental information were between 20% and 56% more likely ($p<.01$) to report that the EU Energy Rating label, EU Eco Flower, Forest Stewardship Council label would influence their in-store decisions if they saw it on a product or service. Moreover, the positive and statistically significant impact of consumer trust of government and environmental NGOs appears consistently across all three government- and NGO-sponsored labels even though the EU Energy Rating label is second party verified. This finding offers some support for Hypothesis 1, which states that *consumers who trust government and environmental NGOs to provide credible environmental information are more likely to utilize ecolabels sponsored by these entities regardless of whether the ecolabels are third-party certified or second party verified.*

Related to private-sector firms, consumers who express having greater distrust of private business to provide them with information were 22% (1.00 minus .78) more likely ($p<.01$) to report that ecolabels had an impact on their purchasing decisions. Related to the specific labels we analyzed, consumers who distrusted business to provide credible environmental information were 19% (1.00 minus .81) more inclined ($p<.01$) to purchase products bearing the EU Energy Rating and the EU Eco Flower, which are both sponsored by government entities. Similarly, consumers were 15% more likely ($p<.05$) to use the Forest Stewardship Council label, which is sponsored by an environmental NGO.

More importantly, we found evidence that consumers who distrusted private business to provide credible environmental information were 19% more inclined ($p<.01$) to purchase products bearing the Soil Association Organic Standard label. This ecolabel is sponsored by a business association that requires third-party certification. This finding offers some evidence in support of Hypothesis 2a, which states that *consumers who distrust business to provide*

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environmental information are more likely to utilize an ecolabel sponsored by a business association if the ecolabel is third-party certified. By contrast, consumers were no more inclined to purchase products bearing the Mobius Loop, another business-sponsored ecolabel, but one that does not require third-party certification. This finding offers some support for Hypothesis 2b, which states that *consumers who distrust business to provide environmental information are no more likely to utilize an ecolabel sponsored by a business association if the ecolabel is second party vertified.*

Related to our control variables, our results show that consumers' general and action-based knowledge of climate-change terminology were associated (29% and 12%, respectively) with an increased likelihood ($p<.01$) of using ecolabels of all sorts. While general climate-change knowledge was not consistently related with consumers' inclination toward using the 5 different ecolabels, action-based knowledge was ($p<.01 – p<.05$). Consumers' sense of personal risk, and older consumers, were related with a greater likelihood of using the 5 ecolabels ($p<.01 –p<.05$), but not overall ecolabel use. Moreover, consumers' gender, age, and sense of empowerment to address climate change were statistically significant ($p<.01 – p<.10$) for all 6 estimation models.

To examine the robustness of our empirical results, we changed our dependent variable such that "Neither agreed nor disagreed" was recoded (from 0 to 1). F-statistics for all six models were significant at $p< 0.01$, indicating that the null effect of the independent variables could be rejected. Moreover, our substantive results remained unchanged. Additionally, we used linear regression to estimate each of our six models. Because the linearity assumption in these models was not met, we summarize the estimation results as a general understanding of the stability of our relationships of interest. In undertaking the linear estimations, we left each model's dependent variable in its original form as a 5-point Likert scale. The F-statistics for all six models were significant at $p< 0.01$, indicating that the null effect of the independent variables could be rejected. The models each contained the same explanatory variables as in our logistic regressions. In comparing the significance and direction of our estimated coefficients to estimates derived from our logistic regression models, only one statistically relevant difference emerged, and that difference was related to a control variable. Overall, these findings offer evidence about the robustness of the relationships we examine and additional support for each of our hypotheses.

—INSERT TABLE 6 ABOUT HERE—
DISCUSSION AND CONCLUSIONS

While ecolabel prevalence has increased significantly across the world, consumers' skepticism about whether ecolabels are credible signals of a product's superior environmental characteristics prevents their widespread use (Dendler, 2014; Atkinson and Rosenthal 2014; Nuttvuthisit and Thøgersen 2015). We assess how third-party certification might reduce consumers' skepticism of ecolabels across different program sponsors. Knowledge of these relationships is important if we are to encourage more pro-environmental behaviors across society, and if ecolabel sponsors are to encourage more widespread interest in their labels.

Our findings suggest that individuals' reported use and intentions to use ecolabels are related to their trust of environmental information sources and the external assurance of ecolabel claims. These results extend earlier research on this topic (Darnall et al 2012) in four ways. First, our research offers important insight about how cognition may serve as a foundation for understanding the relationship between consumers' trust of different environmental information sources and their ecolabel use. Our findings support the notion that individual attitudes (Ajzen and Fishbein 1977; Ajzen 1985) and contextual factors (Stern 2000) help rationalize consumers'

purchasing decisions and enhance consumers' perceived control over their green consumption behavior (Testa et al. 2015). We extend these ideas to the important topic of consumers' ecolabel use by suggesting that consumers appear to differentiate among the sorts of environmental information they receive, depending on their trust or distrust of the information source. That is, individuals appear to conserve their cognitive energy when making decisions (Kahneman and Frederick 2002) and passively assume that information conforms to social expectations (Tost 2011). We show that consumers who trust government and environmental NGOs are more likely to report using or intending to use these sponsors' ecolabels. Since the majority of ecolabels are sponsored either by government or NGOs (Ecolabel Index 2014), our findings highlight the important role that government and environmental NGOs have in maintaining the credibility of their environmental messages to encourage more widespread use of their ecolabels.

By contrast, distrust of private business to provide environmental information was related with consumers' use of government and environmental NGO-sponsored ecolabels. These findings support the idea that when individuals distrust an information source, they appear more likely to engage critically in information processing (Tost 2011) and draw on information from more trustworthy secondary sources (e.g., government and environmental NGOs) to confirm or dismiss the credibility of a business's product claims. Our results also offer important evidence for why private businesses might need to increase the credibility of their environmental messages by participating in government and NGO sponsored ecolabels.

Our second contribution sheds light on the potentially important role that third-party certification may have for encouraging ecolabel use, especially for business-sponsored ecolabels (Starobin and Weinthal 2010). The rise of deceptive or misleading claims by businesses has increased consumer skepticism and encouraged consumers to critically assess business information based on other information cues. Third-party certification has emerged as a mechanism for some business association sponsors to differentiate their ecolabels from others and help assure consumers about the credibility of their environmental claims (Starobin and Weinthal 2010; Janssen and Hamm 2012; Sparks et al. 2013).

Third, drawing on research in cognitive theory, our results offer an important contribution to the broader literature discussing how third-party certification is an effective mechanism towards enhancing credibility (Delmas and Keller 2005; Potoski and Prakash 2005; Darnall and Sides 2008). Our findings emphasize the importance of how contextual factors (Stern 2000) may help enhance consumers' perceived control over their purchasing (Testa et al., 2015) by supporting the idea that third-party certification can help consumers differentiate among different sorts of business-sponsored ecolabels and can serve as an information cue that enhances the consumers' perceived legitimacy of an ecolabel, especially when they distrust the ecolabel sponsor. By contrast, in instances where consumers trust the ecolabel sponsor to provide credible environmental information, our results suggest that consumers tend to passively grant legitimacy to the ecolabel without seeking further reassurance. The merits of certification therefore appear more nuanced than previously considered in that when when the ecolabel sponsor is already trusted, third-party certification may not increase the legitimacy of ecolabels and have little affect on consumers' purchases. These results also highlight the importance of ecolabel sponsors obtaining and maintaining consumers' trust, and how in the absence of trust, business sponsors, may benefit from partnering with trustworthy third parties to certify adherence to ecolabel environmental standards and ecolabel credibility.

One alternative explanation for the variations in consumers' responses across business-sponsored ecolabels may relate to variations in individual-level benefits that accrue from these

ecolabels. For example, the Soil Association Organic Standard label indicates that a product is organically grown. Consumers therefore may be motivated to purchase organic food because doing so generates private benefits (e.g. improved health) as well as public benefits (e.g. reduction in chemical pesticides use). On the other hand, the Mobius Loop label indicates that a product contains recycled or recyclable materials. While offering public benefits, this ecolabel generates fewer private benefits, and therefore may influence consumers to a lesser degree. However, this issue is diminished when we also consider the benefits associated with ecolabels sponsored by trustworthy entities. On one hand, the EU Energy Rating Label is sponsored by government and indicates the extent to which product is energy efficient. Consumers therefore may be motivated to purchase energy efficient products because doing so generates private benefits (e.g., energy cost savings) as well as public benefits (reduced carbon emissions). On the other hand, another government-sponsored label, the EU Eco Flower label, indicates that product has lower environmental impacts to air, water, soil, and human health throughout its life cycle. The EU Eco Flower label offers very little in the way of private benefits, and thus has fewer direct benefits to consumers. Yet, consumers respond similarly to *both government-sponsored labels* in that they are more likely to report using or intending to use these ecolabels despite variations in individual-level benefits and the presence or absence of third-party certification. What distinguishes the Mobius Loop from all other ecolabels in this study is that it lacks both consumer trust of the label sponsor and third-party certification. In the absence of this trust, consumers are likely to question the legitimacy of the ecolabel, especially since it is not certified by an independent third-party, and are less likely to report using or intending to use it.

One limitation of our study is that we cannot rule out the possibility that consumers are equally unpersuaded to utilize ecolabels that are sponsored by an NGO if that label is only second party verified (no such NGO ecolabels existed in our sample). However, our expectation is that certification matters less for consumers' decisions to purchase uncertified NGO ecolabels because of their greater trust in these entities to provide credible environmental information. Prospective research would deepen our understanding by considering this issue further.

The fourth contribution of our research relates to our study's scope. This research advances our understanding of ecolabels in a significant way by studying consumer responses across multiple ecolabels, and for a sizable number of statistically representative consumers. By doing so, we arrive at a more generalized view of the factors related to consumers' reported use and intentions to use ecolabels. We reveal important patterns that would be difficult, if not impossible, to observe when assessing consumers' responses to a single ecolabel, and offer important perspective about these information-based environmental policy tools. While a potential limitation of our approach is that we assess patterns across five ecolabels rather than a broader number, this paper offers some justification for undertaking more cross-cutting studies and sets the stage by identifying the salience of third-party certification as an important component of ecolabel legitimacy, especially for untrustworthy sponsors.

Another limitation of this research relates to the fact that we do not directly measure the cognitive effects of consumers searching for additional information to determine the legitimacy of ecolabel sponsors. We suggest that consumers rely on information cues presented on the ecolabel and draw on prior research to suggest that these cues influence individual cognition (Jiang et al 2008; Schepers 2010) However, future studies should consider this issue more directly. What would also be interesting to know is how different types of search costs influence consumers' ecolabel purchases. Our belief is that consumers' interest in purchasing ecolabeled products will decrease as their search costs rise, however, as yet we know little about the tipping

point at which search costs discourage most ecolabel purchases.

While our research points to the potential role that certification has for ecolabel legitimacy, as yet we do not have sufficient understanding about which ecolabel design features are more likely to lead to greater environmental improvements among ecolabeled products. We also understand little about the extent to which existing ecolabels incorporate legitimate monitoring and conformance expectations. Prospective research should assess these issues for the broader population of 450 ecolabels that exist globally. Knowledge of these relationships is vital to understanding the potential promise that these information-based tools have for improving the natural environment.

Finally, future research should consider whether business sponsors might increase their credibility by building partnerships with other trustworthy sponsors (Delmas, Nairn-Birch, and Balzarova 2013). That is, by collaborating with government and environmental NGOs, business associations may be able to develop ecolabels that are perceived as being more legitimate by consumers. Collaborative ecolabels may generate additional benefits because their engagement of business associations may enhance credibility among private sector actors, even though they still meet the environmental objectives of government and/or environmental NGOs (Darnall and Aragón-Correa 2014).

Acknowledgements

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Figure 1: Consumers' trust of information, the role of third-party certification and consumers' ecolabel use
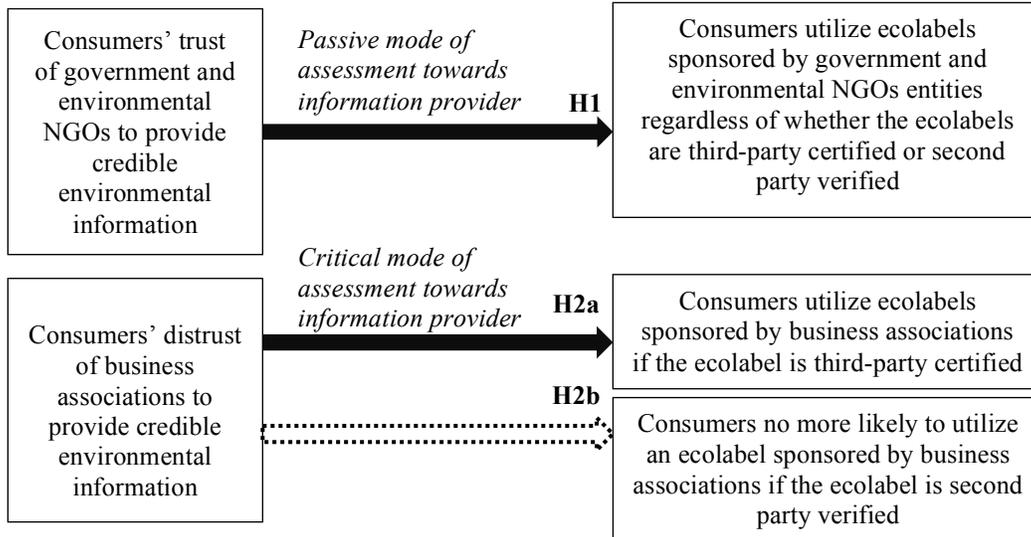
Table 1: Select ecolabels seen in U.K. consumer markets†

Label Name	Label Description
EU Energy Rating Label	• Mandatory European Union Commission certified label established in 1994 • Each EU country establishes national legislation for the program to be enforced Found on light bulbs, cars, and most electrical appliances Rates products from A (the most efficient) to G (the least efficient) Describes an appliance's exact energy consumption (kWh) and its energy efficiency rating Product suppliers need to provide proof of appliance efficiency Enables consumers to compare the energy efficiency of appliances Does not involve third-party certification Consumers who rely on the EU Energy Rating Label derive direct benefits associated with cost savings from reduced energy consumption
European Eco Flower	• Voluntary European Union Commission government label established in 1992 • Label indicates product has lower environmental impacts to air, water, soil, and human health throughout its life cycle, from raw material extraction to end-of-life • Criteria were set by a multi-stakeholder process which included business representatives, environmental NGOs, and consumer organizations • Does involve third-party certification • Label covers 24 product groups including textiles, paints, paper products, detergents, and household appliances in addition to some services (e.g., tourist accommodations and campsites)
Forest Stewardship Council	• Third-party certified environmental NGO label established in 1993 as a response to concerns over global deforestation • Indicates socially and environmentally responsible forestry practices • Authorization is required for label use • Companies' products that have obtained the label have undergone a company-wide audit
Mobius Loop	• Business association label established in 1970 • Does not involve third-party certification • Symbol is used on goods that are 'recyclable' or include 'recycled content' • Most commonly found on cardboard packaging • If the center of the loop contains a number, this means that the item is made from a certain percentage of recycled materials • Use of this symbol is voluntary, and some goods contain recycled materials but use the label • Authorization is not required for label use
Soil Association Organic Standard Label	• Third-party certified business association label established in 1973 • About 80% of U.K. organic food is certified by the Soil Association • Label applies to organically grown food • Covers the processing of food, from milling flour to baking bread and making pizzas, in addition to animal welfare • Involves independent audit and tracking from individual field to the final packing • Symbol is recognized by major supermarkets and independent retailers

† Table includes the primary U.K. labels that have been in existence and used since 1995. Since the implementation of this study, the EU Energy Label scaling has been modified in that the highest achievable rating is A++.

Table 2: Government trust factor analysis

Government Trust to Provide Climate Change Information — "How much do you trust the following entities to provide you with information on climate change …"	Factor Loading
Local authorities	0.650
U.K. government	0.890
European commission	0.824
Cronbach's Alpha	*0.846*

Table 3: Climate change knowledge factor analysis[*]

Climate Change Knowledge— "How familiar are you with each of the following terms…"	Factor Loadings	
	General Knowledge	*Action-based Knowledge*
Climate change	**0.854**	0.157
Carbon or CO_2 emissions	**0.853**	0.195
Carbon offsetting	0.406	**0.663**
Carbon labeling	0.274	**0.642**
Cronbach's Alpha	*0.922*	*0.779*

[*] Loadings stronger than ± 0.50 are bolded.

Table 4: Correlations[*] and descriptive statistics

	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)	15)
1) Trust of government to provide information	1.00														
2) Trust of environmental NGOs to provide information	0.42	1.00													
3) Trust of private business to provide information	0.48	0.20	1.00												
4) General climate change knowledge	0.04	0.09	-0.11	1.00											
5) Action-based climate change knowledge	-0.05	-0.08	-0.02	0.27	1.00										
6) Sense of personal risk related to climate change	0.23	0.37	0.07	0.12	0.00	1.00									
7) Sense of empowerment related to climate change	0.25	0.35	-0.03	0.23	0.09	0.32	1.00								
8) Gender	0.08	0.06	0.10	-0.09	-0.16	0.15	0.09	1.00							
9) Age	-0.10	-0.06	-0.11	0.09	0.07	-0.04	0.04	-0.04	1.00						
10) Education	-0.09	0.07	-0.07	0.17	0.21	0.02	0.11	-0.12	-0.03	1.00					
11) Household income	-0.01	0.04	-0.04	0.09	0.12	-0.02	0.04	-0.16	-0.10	0.28	1.00				
12) Number of kids at home	0.03	0.03	0.12	-0.07	-0.06	0.06	0.02	0.09	-0.35	-0.10	0.02	1.00			
13) Wales	0.02	-0.01	0.01	-0.04	0.00	0.02	0.01	0.04	-0.06	0.00	-0.02	0.08	1.00		
14) Scotland	-0.04	0.00	-0.04	-0.02	-0.01	0.00	0.03	0.01	0.11	0.07	0.02	-0.05	-0.07	1.00	
15) England	0.02	0.01	0.03	0.04	0.00	-0.02	-0.03	-0.03	-0.05	-0.05	0.00	-0.01	-0.60	-0.75	1.00
Mean	2.37	3.50	3.31	0	0	2.69	2.26	1.53	45.09	2.83	3.70	1.69	0.05	0.08	0.87
Standard deviation	0.96	0.99	0.959	0.89	0.74	2.06	1.151	0.5	16.13	1.20	2.09	1.06	0.22	0.27	0.34
Min	1	1	1	-3.06	-1.83	1	1	1	16	1	1	1	0	0	0
Max	5	5	5	1.77	1.49	6	5	2	75	4	11	7	1	1	1

* Correlations above ± 0.051 are statistically significant at *p*<.05.

Table 5: Logistic regression results - factors related to consumers' ecolabel use [†]

Variable	Overall Ecolabel Impact		Inclination towards Ecolabel Use									
			EU Energy Rating		EU Eco Flower		Forest Stewardship		Mobius Loop		Organic Standard	
	Odds Ratio	SE	Odds Ratio	SE	Odds Ratio	SE	Odds Ratio	SE	Odds Ratio	SE	Odds Ratio	SE
Trust of environmental information sources												
Government	1.31***	0.11	1.31***	0.12	1.58***	0.14	1.35***	0.12	1.33***	0.11	1.32***	0.11
Environmental NGOs	1.18***	0.07	1.20***	0.08	1.56***	0.11	1.48***	0.10	1.56***	0.11	1.45***	0.10
Private business	0.78***	0.06	0.81***	0.07	0.81***	0.06	0.85**	0.07	0.88	0.07	0.81**	0.06
Controls												
General climate change knowledge	1.29***	0.10	1.23***	0.09	1.11	0.09	1.28***	0.10	1.11	0.09	1.20**	0.10
Action-based climate change knowledge	1.12**	0.09	1.13**	0.10	1.20**	0.11	1.20**	0.11	1.21***	0.11	1.23**	0.11
Sense of personal risk	1.05	0.03	1.12***	0.04	1.18***	0.04	1.16***	0.04	1.14***	0.04	1.16***	0.04
Sense of empowerment	1.21***	0.07	1.18***	0.07	1.15**	0.08	1.12*	0.07	1.35***	0.08	1.15**	0.07
Gender	1.38***	0.17	1.31**	0.18	2.02***	0.27	1.70***	0.22	1.68***	0.22	1.91***	0.25
Age	1.00	0.00	1.03***	0.00	1.02***	0.00	1.03***	0.00	1.01**	0.00	1.02***	0.00
Education	0.99	0.05	0.96	0.06	0.94	0.05	0.94	0.05	0.94	0.05	1.01	0.06
Household income	1.07**	0.03	1.00	0.03	0.99	0.03	0.99	0.03	0.98	0.03	1.01	0.03
Number kids at home	0.93	0.05	1.10	0.07	0.93	0.06	0.94	0.06	1.05	0.07	1.06	0.07
Wales	1.07	0.29	0.75	0.21	1.50	0.44	1.56	0.45	1.26	0.36	0.69	0.20
Scotland	0.97	0.22	1.16	0.30	1.23	0.30	1.03	0.24	0.88	0.21	1.44	0.34
N	1278		1278		1278		1278		1278		1278	
LRchi2 (14)	122.9***		150.4***		276.9***		255.8***		268.9***		234.9***	
Log likelihood	-821.10		-715.84		-709.92		-755.70		-751.35		-744.96	
Pseudo R-squared	0.118		0.162		0.289		0.247		0.260		0.237	

[†] All models were estimated using logit regression; excluded country dummy variable is England. *Overall Ecolabel Impact* was measured using the recoded question: "Ecolabels have *impact* on my decision to buy products." *Inclination towards Ecolabel Use* was measured by presenting consumers with information about the each ecolabel and asking "with this knowledge to what extent will it influence your in store decisions if you saw this label on a product or service."

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Table 6: Linear regression results - factors related to consumers' ecolabel use [†]

Variable	Overall Ecolabel Impact		Inclination towards Ecolabel Use									
			EU Energy Rating		EU Eco Flower		Forest Stewardship		Mobius Loop		Organic Standard	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Trust of environmental information sources												
Government	0.14***	0.05	0.05***	0.02	0.09***	0.02	0.06***	0.02	0.06***	0.02	0.06***	0.02
Environmental NGOs	0.11***	0.04	0.04***	0.01	0.08***	0.01	0.08***	0.01	0.09***	0.01	0.07***	0.01
Private business	-0.08*	0.04	-0.04***	0.01	-0.04***	0.02	-0.03**	0.02	-0.03	0.02	-0.04***	0.02
Controls												
General climate change knowledge	0.11***	0.04	0.04**	0.02	0.02	0.02	0.05***	0.02	0.02	0.02	0.04**	0.02
Action-based climate change knowledge	0.10**	0.05	0.02	0.02	0.03**	0.02	0.04**	0.02	0.04**	0.02	0.04**	0.02
Sense of personal risk	0.03*	0.02	0.02***	0.01	0.03***	0.01	0.03***	0.01	0.03***	0.01	0.03***	0.01
Sense of empowerment	0.13***	0.04	0.03***	0.01	0.03**	0.01	0.02*	0.01	0.06***	0.01	0.03**	0.01
Gender	0.19***	0.07	0.05*	0.03	0.14***	0.03	0.11***	0.03	0.11***	0.03	0.13***	0.03
Age	0.00*	0.00	0.00***	0.00	0.00***	0.00	0.01***	0.00	0.00**	0.00	0.00***	0.00
Education	-0.02	0.03	-0.01	0.01	-0.01	0.01	-0.01	0.01	-0.01	0.01	0.00	0.01
Household income	0.02	0.02	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
Number kids at home	-0.04	0.03	0.02	0.01	-0.02	0.01	-0.01	0.01	0.01	0.01	0.01	0.01
Wales	0.05	0.16	-0.06	0.06	0.08	0.06	0.09	0.06	0.05	0.06	-0.07	0.05
Scotland	0.04	0.12	0.02	0.04	0.04	0.05	0.01	0.05	-0.02	0.05	0.07	0.05
Constant	3.46***	0.28	0.49***	0.10	0.04	0.10	0.06	0.11	0.25***	0.11	-0.02	0.11
N	1278		1278		1278		1278		1278		1278	
F (14, 1263)	9.49***		12.73***		32.54***		27.42***		32.06***		24.94***	
R-squared	0.103		0.113		0.191		0.182		0.191		0.167	

[†] All models were estimated using linear regression and is included as a robustness check against the logistic regression results; excluded country dummy variable is England. *Overall Ecolabel Impact* was measured using the recoded question: "Ecolabels have *impact* on my decision to buy products." *Inclination towards Ecolabel Use* was measured by presenting consumers with information about the each ecolabel and asking "with this knowledge to what extent will it influence your in store decisions if you saw this label on a product or service."

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$