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Exploring food consumers' motivations to fight both climate change and biodiversity loss: Combining insights from behavior theory and Eurobarometer data

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ABSTRACT

Using data from Eurobarometer 83.4, this study combines the two branches of research that address climate-related and biodiversity-related opinions and actions of individuals in the EU. The literature shows that the differences between climate-related and biodiversity-related policies correspond, at an individual level, to a person's basic attitudes towards environmental protection and towards nature protection, respectively. The contribution of this study is to demonstrate how these attitudes can influence behavior that has environmental repercussions for both issues, such as food consumption practices. The analysis focused on two Eurobarometer questions about buying local and seasonal food (to fight climate change) and about buying organic and local food (to protect biodiversity and nature). The results of two multinomial regression analyses, separately in Northwestern European countries and Eastern and Southern European countries, demonstrated that climate-related and biodiversity-related attitudes were, independent of each other, related to the adoption of these purchase behaviors. The results may support Europe's new Farm to Fork (F2F) strategy and indicate that improving food consumption practices can enable individuals to better play their part in fighting climate change and biodiversity loss simultaneously, which opens up interesting new perspectives for policymakers, businesses and consumers.

1. Introduction

Biodiversity loss and climate change are among the most important threats to humanity (Rockström et al., 2009). From a natural science perspective, these topics are interlinked in many ways, as climate change has serious impacts on biodiversity loss (Bellard, Bertelsmeier, Leadley, Thuiller, & Courchamp, 2012), whereas, vice versa, ecosystems are considered to be crucial for nature-based approaches to mitigate and adapt to the impacts of climate change (Mori, 2020). Moreover, the very same human activities, in particular agriculture and intensive livestock farming, seriously contribute to both biodiversity loss (Erisman, Sutton, Galloway, Klimont, & Winiwarter, 2008; Aiking, 2014) and climate change (Carlsson-Kanyama & González, 2011). Despite these science-based interlinkages, however, food production, biodiversity loss and climate change are treated very differently by many actors in society, such as policy makers, media services and the public at large (Zaccai & Adams, 2012; Schebesta & Candel, 2020). A salient difference is that today climate change is widely considered a serious world problem and that biodiversity loss receives much less attention as a global issue yet (Legagneux et al., 2018). This striking discrepancy may reflect the traditional divide in environmental policy agendas between "brown" issues related to the prevention and control of industrial and urban pollution and "green" issues related to managing the quantity and quality of natural resources and ecosystems (Jamison, 2003; Agyeman, 2008; Kalinowska, 2017). The discrepancy can also be explained by the character of the issues at stake; climate change is considered by many to be primarily due to industrial pollution that is structurally global, but most of the mechanisms involved in biodiversity loss are local and only become a global problem by aggregation (Moran & Kanemoto, 2017). As summarized by Zaccai and Adams (2012), climate change is better defined and better understood as a policy issue, whereas biodiversity loss is less easily understood, more diffuse and less tangible. The divide carries potentially serious consequences for how the issues will be addressed by societal stakeholders, including individuals.

1.1. Behavioral options for food consumers

The present paper focuses on the perception and behavior of food

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consumers. An important question is how climate change and biodiversity loss are perceived by consumers and how this may guide their food practices in a more sustainable direction. The fact that climate change is relatively well-defined makes it easier to calculate what consumers can do to mitigate it. Using the outcome measure of annual carbon savings calculated in per capita CO_2-equivalent reductions, a recent study reviews the literature on mitigation potential of household consumption associated with the three end-use sectors of food, transport and housing (Ivanova et al., 2020). The study shows that various food-related options are associated with sizable reductions. A diet change involving a reduction in the amount of animal products consumed, such as vegan, vegetarian or Mediterranean and similar diets, has a median mitigation potential of 0.9, 0.5 and 0.4 tCO_2eq/capita, respectively (Ivanova et al., 2020). The review shows that organic food have lower emissions compared to conventionally produced food, with a median mitigation potential of 0.4 tCO_2eq/capita, although increases in GHG emissions from organic food for the same diet are not uncommon due to lower crop and livestock yields of organic agriculture and the potential increase in production. The options of choosing regional and local food and choosing seasonal and fresh food involve average reductions of 0.4 and 0.2 tCO_2eq/capita, whereas a reduction in the overall food intake and food waste reduction options each mitigate a median of 0.1 tCO_2eq/capita (Ivanova et al., 2020).

In contrast to these figures, there is no comparable way to calculate the impacts of individual behaviors that could be modified to benefit or reduce their negative impact on biodiversity. The literature on diet and environment tends to consider the effect of land use change as a proxy indicator for biodiversity loss (Ridoutt, Hendrie, & Noakes, 2017), but more refined impact categories are urgently called for (Crenna, Sinkko, & Sala, 2019). Studies demonstrate that reducing meat consumption is key due to the environmental impacts of livestock production (Machovina, Feeley, & Ripple, 2015) and that organic agriculture has many potential benefits (including higher biodiversity, enhanced profitability, and higher nutritional value) as well as many potential costs, including lower yields and higher consumer prices. In summary, the environmental benefits may be highly uncertain when controlling for lower organic yields (Seufert & Ramankutty, 2017). To overcome the problem of a lack of a standard unit of measurement, an Australian study used expert estimates in order to identify relative high impact consumption behavior in the state of Victoria (Selinske et al., 2020). According to the experts the options with the highest impacts include reducing beef and lamb consumption, choosing marine stewardship council (MSC) certified seafood products, and forgoing using non-natural herbicides and pesticides in domestic gardens. The options of choosing organic fruit, vegetables, and grain products, and choosing local and seasonal produce received lower impact scores, which can probably be attributed to contextual issues (Selinske et al., 2020).

Consumer responses to some of the above options (unfortunately not including meat reduction) have recently been assessed in two separate parts of a European public opinion survey (Eurobarometer), organized by the European Union (EU). The latter often uses these surveys for policy development purposes (Haverland, De Ruiter, & Van de Walle, 2018). The climate-related part of Eurobarometer 83.4 explored whether consumers are already helping to "fight" climate change; one of the options was "buying locally produced and seasonal food whenever possible" (European Commission, 2015a; question a6). This survey is one in a series of Eurobarometers, of which the earliest dates from 2008 (Duijndam & van Beukering, 2020), that aim to measure consumers' appraisal of climate change and climate mitigation behavior. Other options include choosing more energy efficient household appliances or avoiding short-haul flights whenever possible. The option of buying local and seasonal food has become a reasonably accepted way in which consumers can contribute to climate change mitigation (Whitmarsh, Seyfang, & O'Neill, 2011; Hoolohan, Berners-Lee, McKinstry-West, & Hewitt, 2013; de Boer, de Witt, & Aiking, 2016). The option may appeal to consumer beliefs that they can achieve positive change through reducing carbon emissions (Bostrom et al., 2012), although they may also have other reasons for choosing these products, such as quality and freshness (Feldmann & Hamm, 2015; Bazzani, Caputo, Nayga Jr, & Canavari, 2017).

The biodiversity-related part of the same survey was relatively new. Acknowledging the fact that biodiversity might be a less familiar concept to consumers, the survey explored to what extent consumers are already making an effort to protect biodiversity and nature; one of the options was "regularly buying products that are eco-friendly or locally produced (e.g. organic, biologically degradable)" (European Commission, 2015b; question b14). Other options include respecting nature protection rules (e.g. by not leaving waste in the forest) and adopting potentially eco-friendly gardening practices. The food-related option may be attractive to consumers with high appreciation of nature; studies show that buying eco-friendly or locally produced food is correlated with the degree to which consumers feel connected to nature and care about species becoming extinct (Vogt, 2007; Hedlund-de Witt, de Boer, & Boersema, 2014; Janssen, 2018; Ditlevsen, Sandøe, & Lassen, 2019), or have health concerns (Roininen, Arvola, & Lähteenmäki, 2006), although they are currently not without criticism on the environmental performance of organic products (Hansmann, Baur, & Binder, 2020). As various authors have noted, it is due to the growing global standardization and industrialization of organic food that organic agriculture has lost some of its luster in recent years, whereas local food may have gained in importance (Feldmann & Hamm, 2015; Bazzani et al., 2017). Hence, there is some competition between organic and local food, the specifics of which may vary across products (e.g. fresh vs. non-perishable or plant vs. animal products), across markets and over time (Zepeda & Nie, 2012; Denver & Jensen, 2014).

The urgency of climate change, biodiversity loss, and food policies, as well as the necessary integration of these policy areas was underlined by the new EU Farm to Fork (F2F) Strategy for a fair, healthy and environmentally-friendly food system (European Commission, 2020). An important question on consumer behavior is to what extent the group who are already helping to "fight" climate change and buys locally produced and seasonal food overlaps with the group who are making an effort to protect biodiversity and buys products that are eco-friendly or locally produced.

The more general question is whether climate change and biodiversity loss are distinct sources of concern for food consumers, and whether these concerns operate as complements or substitutes. However, to date, we are not aware of any studies on the combination of the two parts of the survey. The present study involves both theoretical analysis of the relevant concerns and actions, based on the literature, and empirical analyses of the combined Eurobarometer data. The aim is to provide insight into these matters, which could also be relevant to other food choices that may affect climate change and biodiversity loss.

1.2. Theoretical analysis of the relevant concerns and actions

The theoretical analysis builds on the insights from psychology and sociology on the development of environmental attitudes and behavior. An attitude is "a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor" (Eagly & Chaiken, 1993, p. 1). The entity may be symbolic or concrete, such as goals and actions. Empirically, it has been found that a person's evaluative responses to a set of behavioral options can become representative for a certain attitude, especially if the attitude implies a goal that is relevant to the options, such as the goal of protecting human health or protecting the environment (Campbell, 1963; Kaiser & Wilson, 2004; Kaiser, Hartig, Brügger, & Duvier, 2013). The words "environmental attitude" and "environmental concern" are sometimes used interchangeably, although the first is conceptually more accurate. In terms of goal theory (Kruglanski et al., 2002; Kopetz, Kruglanski, Arens, Etkin, & Johnson, 2012), helping to protect the environment might become the focal goal of certain specific activities, such as recycling (Thomas &

Sharp, 2013; Geiger, Steg, van der Werff, & Ünal, 2019). It may also become one of the background goals in the case of activities aimed at other goals. For example, protecting the environment may not be the focal goal of food consumption, but food consumption has socially recognized environmental repercussions (e.g. waste generation (Tobler, Visschers, & Siegrist, 2011)) and reducing these may become a background goal (i.e. a goal of secondary importance which may also influence choices). Possibly in combination with other issues, the cultural meaning of food's environmental repercussions has evolved over time to include criticism of pesticide use (Jamison, 2003; Vogt, 2007; Hansmann et al., 2020) and, to a certain extent, meat consumption (de Bakker & Dagevos, 2012; de Boer et al., 2016; Jallinoja, Niva, & Latvala, 2016; Graça, Truninger, Junqueira, & Schmidt, 2019). More generally, dependent on the material consequences and cultural meaning of activities, environmental protection can become an overarching background goal that is relevant to an individual in relation to many different practices (Stern, 2000; Jamison, 2003), although waste-related practices have remained appealing to the largest number of consumers (Siegrist, Visschers, & Hartmann, 2015; Dubuisson-Quellier & Gojard, 2016; Gould, Ardoin, Biggar, Cravens, & Wojcik, 2016).

Goal-directed activities are often what sociologists call "social practices" (Bourdieu, 1984; Reckwitz, 2002), involving people who actively integrate particular materials, cultural meanings and forms of competence as ingredients of a practice, such as barbequing (Shove & Pantzar, 2005). In correspondence, practices significantly vary in the amount of behavioral difficulties (or costs) they incur, which means that, in a given social setting, individuals may be more or less likely to perform them. This applies also to the likelihood of performing practices with different degrees of environmentally friendly effects. Analytically viewed, there could be a continuum that discriminates among individuals who put high value on the goal of environmental protection and are willing to bear high costs and individuals who value the goal much less and are only willing to do easy things (Campbell, 1963; Kaiser & Wilson, 2004). Using a Rasch-type model to mathematically model this continuum, Kaiser and Wilson (2004) showed in a Swiss study that the assumed overall goal could be linked to 50 behavioral items, which covered 6 different domains of behavior, including recycling, energy conservation, transport and mobility and consumerism (nine items of which two are related to food). In line with this work, it has also been revealed that appreciation of environmental protection can be distinguished from appreciation of nature (represented by 40 items in Kaiser et al., 2013), as the latter is grounded in gratifying experiences involving natural settings and features of the natural world, such as enjoying gardening (Thompson & Barton, 1994; Coisnon, Rousselière, & Rousselière, 2019). Rigorous research is difficult in this area, because gardeners are a self-selected group, but studies suggest that gardening has many positive aspects, enabling people to relieve stress, to grow some vegetables and to internalize ecological principles (Jamison, 2003; Freeman, Dickinson, Porter, & van Heezik, 2012). Measures of both activity-based attitudes (toward environmental protection actions and toward nature preservation actions) are substantially positively correlated, but there is important theoretical and practical value in treating them as separate attitudes, because, as Kaiser et al. (2013) note, the first may be linked with self-sacrifices and, thus, with unselfishness, whereas the second may reveal the power of benign self-interest in motivating ecological behavior.

The distinction between attitudes toward environmental protection actions and toward nature preservation actions does not necessarily mean that there are one-on-one relationships between these attitudes and concerns about specific environmental issues, such as climate change and biodiversity loss. These and other, more-or-less agreed upon, environmental issues have become prominent in the public mind as a result of the rise of environmental awareness in the industrialized Western democracies from the 1960s through the 1980s (Rootes, 2004). The issues are complex and the corresponding concerns are influenced by different factors such as value orientations, information exposure and the perception of actual problems (Zeus & Reif, 1990). Although it is difficult to establish a boundary around such issues, it appears that, in terms of what an individual can do, climate change is often linked to environmental protection actions (Ortega-Egea, García-de-Frutos, & Antolín-López, 2014; European Commission, 2015a), whereas biodiversity is linked to practices, such as eco-friendly gardening (European Commission, 2015b; Coisnon et al., 2019). Hence, the distinction suggests that climate-related and biodiversity-related attitudes can work in parallel to guide activities with different environmental repercussions (related to both climate change and biodiversity), such as food consumption practices.

1.3. The present study

The empirical analysis combines the climate-related and biodiversity-related branches of Eurobarometer 83.4, which has resulted in a large and complex data set. The study builds on earlier work on the parts separately (since the year 2008), and on earlier Eurobarometers, for the choice of relevant variables, the treatment of the items and approaches for incorporating the complexities of the sample design (see below). The central hypothesis, based on the above theory, focuses on the responses to the items on buying locally produced and seasonal food (to fight climate change) and buying products that are eco-friendly or locally produced (to protect biodiversity), which show four different response combinations (no-no, yes-no, no-yes and yes-yes). Assuming that individuals' responses to the climate actions (excluding the food item) reflect their attitude toward environmental protection actions and that their responses to the biodiversity actions (excluding the food item) reflect their attitude toward nature protection actions, the hypothesis to be explored is that both sets of responses are, independent of each other, correlated with affirmative answers to the questions about buying local and seasonal food and about buying organic and local food. Taking into account that the answers of survey participants tend to reflect what information is currently or typically accessible to them (Tourangeau, 2018), the affirmation of both options, in particular, may reflect that consumers were motivated by both concerns, whereas the affirmation of one only option may indicate that they were differently motivated by either climate-related or biodiversity concerns. The hypothesis was investigated with a multivariate analysis to control for the impacts of other variables.

The behavioral options to fight climate change (henceforth "climate actions"), which have been asked since 2008 (Ortega-Egea et al., 2014), were often analyzed separately (e.g. Davidescu, Apostu, & Paul, 2020), although they appear to have many correlates in common (see also Pirani & Secondi, 2011; Meyer, 2015). The relevant correlates include gender (women were more likely than men to engage in private-sphere pro-environmental activities), age (allowing for non-linear effects that reveal birth cohort and life cycle aspects), years of education, level of political interest, and political ideology (Davidescu et al., 2020). The assumption that a set of items measures an underlying attitude makes it desirable to check the interrelatedness of the items by calculating Cronbach's alpha, which provides information about the interpretability of summated scores (Cronbach, 1951; Sijtsma, 2009). However, due to the relatively small numbers of (binary) items in the set, high alpha may not be expected. Moreover, as noted by Meyer (2015), grouping these behaviors into one variable would neglect that some of the behaviors deliver cost savings (or could be subsidized) and some are costly. For some specific actions, such as "bought a low fuel car", "insulated house better" or "bought a low-energy home", the profile of individuals inclined to adopt these actions was slightly different (e.g. more often males) (Davidescu et al., 2020). That might also be a reason to keep the items apart.

The Eurobarometer questions on biodiversity loss had been tried in pilot interviews by telephone. However, the report notes that due to the complexity of the topic and the length of the questionnaire, the current wave of this survey was conducted face-to-face, which can contribute to

the interviewees' better understanding of the subject and questions (European Commission, 2015b). After the first question (Have you ever heard of the term "biodiversity"?) all respondents received a short explanation (see below). Also if they had not heard of the term before (about 40%), they were mostly able to answer follow-up questions, but it will be important to take into account that the respondents showed very different levels of awareness and understanding of biodiversity issues (Kalinowska, 2017). The set of questions on behavior options (henceforth "biodiversity actions") included a subset about potentially eco-friendly gardening practices. The reported adoption of each of the gardening practices has been analyzed by Coisnon et al. (2019), who concluded that personal characteristics such as being a woman, older, better educated, having a left political sensibility or living in a larger household significantly increased the probability to adopt all four sustainable gardening practices, whereas urban households were less likely to adopt them. This study also found some differences between countries, mainly associated with economic factors (a higher economic performance per capita was positively associated with reported use of these practices).

Overall, the literature indicates several variables that should be treated as covariates in the multivariate analysis. These include measures of the seriousness of climate change, and measures of awareness and seriousness of biodiversity loss, next to some standard personal characteristics. The latter are relevant because pro-environmental actions are not necessarily motivated by environmental concerns (see e.g. Gifford & Nilsson, 2014). The country differences that have been found in the various studies can largely be attributed to three (interrelated) dimensions, i.e. economic performance, (indicators of) environmental performance (although more heterogeneous) and social indicators (including social trust), which are generally higher in Northwestern European countries than in Eastern or Southern countries (Cling, Eghbal-Téhérani, Orzoni, & Plateau, 2019; Coisnon et al., 2019). The Northwest also has a longer history in environmental awareness (Rootes, 2004). Additionally, other authors have focused on an ideological east – west divide. According to McCright, Dunlap, and Marquart-Pyatt (2016), in 2008 Western-European citizens on the political left reported stronger belief in the seriousness of climate change and more support for action to mitigate it than did Western-European citizens on the right, but this association was not found in the 11 former Communist countries, which the authors attribute to the low political salience of climate change and the differing meaning of left–right identification in these countries. As modelling country differences is not the topic of the present study, the analyses were done separately for consumers in Northwestern (henceforth NW) countries and those in Eastern and Southern (henceforth E&S) countries.

2. Method

2.1. Data

The two subsections of the data have been described in two reports, European Commission (2015a) and European Commission (2015b), respectively, and have been archived as one set (European Commission, 2018). The survey, covering the European population of 15 years and older, was carried out by TNS Opinion & Social network in the 28 Member States of the European Union between the 30th of May and 8th of June 2015. Some 27,719 respondents (around 1000 in each country, 500 in the three smallest countries) were interviewed face-to-face at home in their mother tongue. The basic sample design applied in all states is a multi-stage, random (probability) one, providing a representative sample at the regional and national levels. In each country, a number of sampling points was drawn with probability proportional to population size (for a total coverage of the country) and to population density, which were subsequently used to draw addresses, households and persons. For each country, a national weighting procedure, using marginal and intercellular weighting, was carried out based on gender, age, region and size of locality.

2.2. Data analyses

All calculations were made by SPSS 26 for Windows. Multinomial logistic regression (logit model) was used to estimate odds ratios (OR) to quantify the strength of association between each of the independent variables in the model and the dependent variable. Multicollinearity was checked by tolerance diagnosis performed by SPSS and inspection of the correlation matrix. The p-value for significance was set at 0.05, but given the large sample size, the effect sizes are more informative about potential relationships than their significance. From a statistical perspective, the country-based sample design means that the 27,719 respondents (11,467 in NW countries and 16,252 in E&S countries) cannot be treated as independent observations. The present study takes this into account by following the strategy to pool the data in each country group and calculate the regression, while controlling for additional country differences by including country-specific intercept dummy variables (see Bryan & Jenkins, 2016).

2.3. Dependent variable

The set of four combined answers to the binary questions about buying local and seasonal food (question a6) and about buying organic and local food (question b14) was the dependent variable. The no-no responses were the reference category.

2.4. Climate- and biodiversity-related independent variables

Seriousness of climate change was based on (1) whether climate change was selected (firstly or secondly) from a set of eight as one of the two most serious problems facing the world as a whole and (2) rated seriousness (how serious a problem do you think climate change is at this moment? '1′ meaning "not at all serious" and '10′ "an extremely serious problem), condensed to three categories. The two items were treated separately.

Attitude toward climate actions was derived from the set of responses to one general item (Have you personally taken any action to fight climate change over the past six months?) and ten binary items on specific actions (with the exception of the food-related action). All were asked: Which of the following actions, if any, apply to you? The abbreviated options were: (a) bought a new car with low fuel consumption, (b) regularly used environmentally-friendly alternatives to using your private car, (c) insulated your home better, (d) bought a low-energy home, (e) chose more energy efficient household appliances, (f) switched to an energy supplier which offers a greater share of energy from renewable sources, (g) installed equipment (e.g. solar panels) to generate renewable electricity, (h) avoided short-haul flights whenever possible, (i) reduced your waste and regularly separate it for recycling, and (j) cut down on your consumption of disposable items.

Awareness and seriousness of biodiversity loss was measured after an introduction. After the first question (Have you ever heard of the term "biodiversity"?) all respondents received the following explanation: "*Biological diversity – or biodiversity – is the term given to the variety of life on Earth (like plants, animals, genes, but also ecosystems such as forests, oceans, etc.) of which we are an integral part. Biodiversity in Europe and in other parts of the world is being lost and degraded due to human activities.*" The set of five questions included the question whether the respondents had heard the term before and knew what it means (three answer categories), how informed they feel about the loss of biodiversity? (four degrees of being informed), whether they thought that the degradation of nature and the decline and possible extinction of animal and plant species would affect them personally? (yes, you are already affected by this; yes, this will have an effect on you, but not now, later on; no, not on you personally but on the next generation; no, this will have no effect), and their opinion on the seriousness of the decline and possible

extinction of animal and plant species, natural habitats and ecosystems (a) locally, in the area where you live, (b) globally, on the planet (four degrees of seriousness). Two items referring to other locations (in our country and in Europe) were not included to avoid repetition.

Attitude toward biodiversity actions was derived from the set of responses to one general question (Would you say that you personally make an effort to protect biodiversity and nature? Yes, you do; yes, but you would like to do even more; no, because you do not know what to do; no, for other reasons) and a number of specific questions (with the exception of the food-related action). A first set started with the question: please tell me whether or not you personally do the following: (a) respecting nature protection rules (e.g. by not leaving waste in the forest), (b) looking for information and making lifestyle choices that reduce possible negative impacts on nature and biodiversity, (c) participating as a volunteer (e.g. field work in nature reserves) and (d) contributing to monitoring projects (e.g. to count migratory birds). Another set started with the question: Do you personally do the following in your garden or on your balcony? (e) leave space for wild animals and plants, (f) avoid using pesticides and chemicals, (g) select plants that provide food for birds and pollinating insects, (h) avoid introducing new plants that may become invasive. A separate answer category to this question enabled the participants to state that they did not have "a garden or balcony", which was used as a covariate.

2.5. Other covariates

The set of other covariates was derived from the data file. The set includes *gender*, four different *age categories* (15 – 24 years, 25 – 34 years, 35 – 64 years and 65 years or over), allowing for non-linear effects, *years of full-time education* (left school at the age of 15 or earlier; the age of 16 – 19; or the age of 20 or later; those who were still studying were classified based on their current age), *having children* younger than 10 years of age in the household, *having a garden or balcony*, *area of living (*in rural area or village; small or middle sized town; or large town*)*. The set also included answers to some standard questions, such as *life satisfaction* (On the whole, are you very satisfied, fairly satisfied, not very satisfied, or not at all satisfied with the life you lead?), *difficulties paying bills* (During the last twelve months, would you say you had difficulties to pay your bills at the end of the month, most of the time, from time to time, almost never/never), *level of political interest* (political interest index with four levels (not at all; slightly; moderately; strongly) constructed by summing three items), and *left – right self-placement* (In political matters people talk of "the left" and "the right". How would you place your views on this scale? recoded into 4 categories: left; center; right; don't know/refusal).

3. Results

Table 1 presents the four categories of the dependent variable and the answer percentages to the two questions in both parts of Europe. The table reveals that relatively small percentages reported only purchases of local and seasonal food (8% and 12%), that somewhat higher percentages reported only purchases of organic and local food, (25% and 25%), and that relatively high percentages reported both (47% and 34%). This pattern of results was found in both parts of Europe.

Table 2 provides an overview (min, max, mean and SD) of the independent variables used in the analysis, apart from the country dummies. These involve climate change actions (11 items), biodiversity actions (9 items), seriousness of climate change (2 items), awareness and seriousness of biodiversity loss (5 items), and the other covariates (10 items). The results of the multinomial logistic regression are presented in Table 3, reported as odds ratios (OR) with 95% confidence intervals (95% CI). The coefficients indicate the magnitude of each variable's impact on the odds of being in a particular category (yes–no, no-yes or yes-yes responses) rather than in the reference category due to a unit change in the independent variable, given the other variables. In the final model of the NW countries, positive attitudes toward both climate

Table 1
Categories and percentages of responses of the dependent variable.

Categories	Percentages of responses	
	NW countries[1]) (N = 11,467)	E&S countries[2]) (N = 16,252)
Reported no-no	20%	29%
Reported yes–no (only purchases of local and seasonal food)	8%	12%
Reported no-yes (only purchases of organic and local food)	25%	25%
Reported yes-yes (both purchases)	47%	34%
	(100%)	(100%)

[1]) NW Europe consists of Sweden, Finland, Denmark, the United Kingdom, Ireland, Belgium, the Netherlands, Luxembourg, France, Germany, and Austria.
[2]) The E&S European countries include Estonia, Latvia, Lithuania, Poland, Czechia, Slovakia, Hungary, Bulgaria, Romania, Slovenia, Croatia, Greece, Republic of Cyprus, Malta, Italy, Spain and Portugal.

Table 2
Independent variables and covariates: Min, Max, Mean and SD.

	Min	Max	NW countries (N = 11,467)		E&S countries (N = 16,252)	
			Mean	SD	Mean	SD
Climate actions						
Personal effort[1])	0	1	0.58	0.49	0.41	0.49
Recycles	0	1	0.81	0.39	0.64	0.48
Avoids disposables	0	1	0.65	0.47	0.50	0.50
Efficient appliances	0	1	0.50	0.50	0.38	0.48
Uses car alternatives	0	1	0.47	0.50	0.29	0.45
Insulated house better	0	1	0.28	0.45	0.21	0.41
Low fuel car	0	1	0.20	0.40	0.09	0.29
Avoids flights	0	1	0.20	0.40	0.08	0.27
Changed supplier	0	1	0.14	0.35	0.04	0.20
Installed equipment	0	1	0.07	0.26	0.04	0.20
Bought low-energy home	0	1	0.06	0.24	0.03	0.18
Biodiversity actions						
Personal effort[1])	1	4	3.03	0.91	2.87	0.93
Respects protection rules	0	1	0.94	0.24	0.91	0.29
Avoids using pesticides	0	1	0.60	0.49	0.50	0.50
Adapts lifestyle choices	0	1	0.53	0.50	0.44	0.50
Space for wild species	0	1	0.39	0.49	0.18	0.39
Selects plants for birds/insects	0	1	0.37	0.48	0.20	0.40
Avoids hosting invasives	0	1	0.33	0.47	0.21	0.40
Helps as a volunteer	0	1	0.11	0.32	0.12	0.32
Helps monitoring work	0	1	0.11	0.31	0.08	0.28
Climate related covariates						
Serious world problem	0	1	0.58	0.49	0.38	0.49
Rating seriousness	1	3	2.55	0.67	2.57	0.68
Biodiversity related covariates						
Aware of concept[1])	1	3	1.95	0.83	1.90	0.84
Being informed[1])	1	4	2.30	0.84	2.15	0.85
Personally affected[1])	1	4	2.68	0.88	2.73	0.93
Seriousness locally[1])	1	4	2.56	0.94	2.54	0.93
Seriousness globally[1])	1	4	3.54	0.75	3.32	0.90
Other covariates						
Female	0	1				
Age 15 – 24 years	0	1	0.14	0.35	0.14	0.34
Age 25 – 34 years	0	1	0.14	0.35	0.16	0.37
Age 35 – 64 years	0	1	0.50	0.50	0.50	0.50
Age 65 and older	0	1	0.21	0.41	0.21	0.40
Children < 10 years	0	1	0.21	0.40	0.20	0.40
Years of Education[1])	1	3	2.36	0.68	2.14	0.67
Life satisfaction[1])	1	4	3.34	0.65	2.83	0.75
Difficulties paying bills[1])	1	3	1.30	0.56	1.60	0.71
Political interest[1])	1	4	2.70	0.95	2.60	0.97
Self-placement: left	0	1	0.30	0.46	0.21	0.41
Self-placement: center	0	1	0.35	0.48	0.30	0.46
Self-placement: right	0	1	0.23	0.42	0.21	0.40
Don't know/ refusal	0	1	0.11	0.32	0.28	0.45
Rural – urban area	1	3	1.97	0.75	1.97	0.77
Has a garden/balcony	0	1	0.88	0.33	0.81	0.39

[1]) Recoded from low to high.

Table 3
Results of the multinomial logistic regression on the combined responses to the items on buying local and seasonal food and on buying organic and local food: Odds ratios and 95% confidence intervals.

Independent variables	NW countries (N = 11,467)[1])			E&S countries (N = 16,252) [2])		
	Yes-no responses	No-yes responses	Yes-yes responses	Yes-no responses	No-yes responses	Yes-yes responses
Country dummies (not shown)						
Climate actions						
Personal effort	1.03 (0.85, 1.24)	1.32 (1.15, 1.51)***	1.46 (1.28, 1.67)***	1.01 (0.88, 1.16)	1.32 (1.18, 1.48)***	1.37 (1.23, 1.54)***
Recycles	1.49 (1.19, 1.87)**	0.95 (0.82, 1.10)	1.71 (1.46, 2.01)***	1.23 (1.08, 1.41)**	0.96 (0.86, 1.07)	1.57 (1.40, 1.76)***
Avoids disposables	1.54 (1.28, 1.86)***	0.94 (0.83, 1.08)	1.77 (1.72, 2.25)***	1.39 (1.23, 1.57)***	1.21 (1.09, 1.35)***	2.02 (1.82, 2.24)***
Efficient appliances	1.51 (1.26, 1.81)***	1.01 (0.88, 1.15)	1.72 (1.51, 1.96)***	1.74 (1.53, 1.98)***	1.09 (0.98, 1.22)	1.88 (1.69, 2.09)***
Uses car alternatives	1.25 (1.04, 1.50)*	1.32 (1.16, 1.51)***	1.65 (1.45, 1.88)***	1.47 (1.28, 1.69)***	1.19 (1.05, 1.34)**	1.94 (1.73, 2.18)***
Insulated house better	1.11 (0.90, 1.57)	1.05 (0.90, 1.22)	1.14 (0.98, 1.33)	1.27 (1.08, 1.48)**	1.07 (0.94, 1.23)	1.26 (1.10, 1.43)**
Low fuel car	1.35 (1.08, 1.70)**	0.99 (0.84, 1.18)	1.09 (0.92, 1.28)	0.94 (0.75, 1.17)	1.26 (1.04, 1.52)*	1.23 (1.02, 1.47)*
Avoids flights	1.84 (1.45, 2.34)***	0.93 (0.76, 1.13)	1.89 (1.58, 2.26)***	2.65 (2.17, 3.21)***	0.91 (0.72, 1.15)	2.17 (1.76, 2.67)***
Changed supplier	0.97 (0.73, 1.30)	1.16 (0.95, 1.43)	1.25 (1.03, 1.52)*	0.95 (0.69, 1.31)	1.00 (0.76, 1.31)	1.14 (0.88, 1.48)
Installed equipment	0.88 (0.61, 1.27)	0.96 (0.74, 1.24)	0.83 (0.64, 1.07)	0.91 (0.65, 1.26)	0.96 (0.74, 1.24)	0.71 (0.54, 0.92)*
Bought low-energy home	1.06 (0.73, 1.53)	1.02 (0.78, 1.33)	1.24 (0.96, 1.61)	1.15 (0.81, 1.64)	1.08 (0.81, 1.44)	1.16 (0.87, 1.55)
Biodiversity actions						
Personal effort	1.07 (0.97, 1.18)	1.33 (1.24, 1.42)***	1.35 (1.26, 1.45)***	1.04 (0.97, 1.11)	1.45 (1.36, 1.54)***	1.43 (1.34, 1.52)***
Respects protection rules	1.31 (0.96, 1.78)	1.68 (1.33, 2.11)***	2.32 (1.77, 3.04)***	1.22 (1.01, 1.47)*	1.98 (1.66, 2.36)***	2.37 (1.93, 2.90)***
Avoids using pesticides	1.08 (0.88, 1.31)	1.44 (1.26, 1.86)***	1.78 (1.54, 2.05)***	1.15 (1.01, 1.32)*	1.41 (1.26, 1.58)***	1.77 (1.58, 1.98)***
Adapts lifestyle choices	1.28 (1.06, 1.55)*	1.77 (1.54, 2.03)***	2.09 (1.83, 2.39)***	1.22 (1.06, 1.40)**	2.17 (1.94, 2.43)***	2.12 (1.90, 2.36)***
Space for wild species	0.97 (0.79, 1.19)	0.97 (0.84, 1.12)	1.16 (1.00, 1.34)*	1.13 (0.95, 1.35)	1.03 (0.89, 1.20)	1.21 (1.05, 1.40)**
Selects plants for birds/insects	1.39 (1.13, 1.71)*	1.12 (0.96, 1.30)	1.47 (1.27, 1.70)***	1.26 (1.01, 1.51)**	1.25 (1.08, 1.44)**	1.47 (1.28, 1.70)***
Avoids hosting invasives	1.01 (0.81, 1.25)	1.01 (0.86, 1.19)	1.21 (1.04, 1.41)*	1.32 (1.11, 1.55)**	1.08 (0.94, 1.25)	1.43 (1.24, 1.63)***
Helps as a volunteer	1.03 (0.73, 1.47)	1.66 (1.31, 2.12)***	1.37 (1.07, 1.75)*	0.94 (0.73, 1.21)	1.51 (1.25, 1.82)***	1.22 (1.01, 1.48)*
Helps monitoring work	1.33 (0.93, 1.90)	1.67 (1.30, 2.14)***	1.60 (1.24, 2.06)***	1.14 (0.81, 1.58)	2.82 (2.24, 3.34)***	2.09 (1.65, 2.66)***
Climate related covariates						
Serious world problem	0.95 (0.79, 1.14)	1.12 (0.98, 1.28)	1.23 (1.07, 1.40)**	1.03 (0.91, 1.17)	0.96 (0,87 1.07)	0.95 (0.86, 1.05)
Rating seriousness	0.98 (0.86, 1.12)	1.09 (0.99, 1.20)	1.12 (1.02, 1.23)*	1.12 (1.02, 1.23)*	1.09 (1.00, 1.17)*	1.16 (1.08, 1.26)***
Biodiversity related covariates						
Aware of concept	0.96 (0.84, 1.09)	1.02 (0.93, 1.12)	1.15 (1.05, 1.26)**	1.09 (1.00, 1.19)	1.04 (0.96, 1.12)	1.08 (1.01, 1.16)*
Being informed	1.02 (0.91, 1.16)	1.12 (1.03, 1.22)*	1.04 (0.96, 1.14)	0.94 (0.86, 1.03)	1.11 (1.03, 1.19)**	1.16 (1.08, 1.24)***
Personally affected	1.09 (0.98, 1.22)	1.08 (1.00, 1.17)*	1.18 (1.09, 1.27)***	1.00 (0.93, 1.07)	1.02 (0.96, 1.08)	1.07 (1.01, 1.14)*
Seriousness locally	1.00 (0.91, 1.09)	1.05 (0.99, 1.12)	1.05 (0.98, 1.12)	0.99 (0.93, 1.05)	1.04 (0.99, 1.10)	1.02 (0.97, 1.07)
Seriousness globally	0.96 (0.87, 1.05)	1.03 (0.96, 1.12)	1.10 (1.02, 1.18)*	1.03 (0.98, 1.09)	1.00 (0.95, 1.05)	1.02 (0.97, 1.07)
Other covariates						
Female	1.52 (1.28, 1.81)***	1.30 (1.15, 1.48)***	1.99 (1.76, 2.24)**	1.13 (1.01, 1.27)	1.18 (1.07, 1.30)**	1.49 (1.35, 1.64)***
Age 15 – 24 years	0.73 (0.55, 0.97)*	0.74 (0.60, 0.92)*	0.53 (0.43, 0.66)***	0.67 (0.54, 0.84)***	0.70 (0.58, 0.84)***	0.51 (0.43, 0.61)***
Age 25 – 34 years	0.61 (0.44, 0.83)*	0.93 (0.74, 1.17)	0.73 (0.58, 0.91)**	1.00 (0.81, 1.23)	1.02 (0.86, 1.23)	0.84 (0.70, 1.00)
Age 35 – 64 years	0.65 (0.53, 0.82)***	1.05 (0.88, 1.25)	0.79 (0.66, 0.93)**	0.96 (0.82, 1.12)	1.04 (0.91, 1.20)	0.89 (0.78, 1.02)
Age 65 and older	Reference	Reference	Reference	Reference	Reference	Reference
Children < 10 years	1.26 (1.01, 1.58)*	1.34 (1.15, 1.58)***	1.18 (1.01, 1.39)*	0.87 (0.74, 1.01)	0.97 (0.86, 1.10)	0.91 (0.80, 1.03)
Years of Education	0.95 (0.83, 1.10)	1.07 (0.96, 1.18)	1.16 (1.05, 1.29)**	0.95 (0.86, 1.05)	1.06 (0.98, 1.15)	1.06 (0.97, 1.15)
Life satisfaction	0.96 (0.83, 1.09)	1.11 (1.01, 1.23)*	1.13 (1.02, 1.24)*	1.06 (0.97, 1.16)	1.09 (1.02, 1.18)*	1.13 (1.05, 1.22)**
Difficulties paying bills	1.28 (1.11, 1.49)**	0.92 (0.82, 1.03)	0.92 (0.82, 1.03)	1.02 (0.93, 1.12)	0.95 (0.88, 1.03)	1.02 (0.94, 1.10)
Political interest	1.08 (0.98, 1.19)	1.14 (1.06, 1.22)***	1.16 (1.08, 1.24)***	1.05 (0.98, 1.12)	1.09 (1.03, 1.15)**	1.12 (1.06, 1.18)***
Self-placement: left	1.70 (1.25, 2.32)**	1.07 (0.87, 1.33)	1.51 (1.22, 1.88)***	1.26 (1.06, 1.49)*	0.81 (0.70, 1.94)**	0.96 (0.83, 1.11)
Self-placement: center	1.38 (1.03, 1.84)*	0.96 (0.,79 1.16)	1.35 (1.10, 1.65)**	1.34 (1.15, 1.57)***	0.95 (0.84, 1.08)	0.99 (0.87, 1.13)
Self-placement: right	1.83 (1.35, 2.49)**	0.93 (0.75, 1.15)	1.39 (1.11, 1.73)**	1.09 (0.91, 1.30)	0.97 (0.84, 1.11)	0.89 (0.77, 1.04)
Don't know/ refusal	Reference	Reference	Reference	Reference	Reference	Reference
Rural – urban area	0.93 (0.83, 1.05)	0.97 (0.89, 1.06)	0.81 (0.75, 0.89)***	1.19 (1.10, 1.29)***	1.10 (1.03, 1.17)**	1.02 (0.96, 1.09)
Has a garden/balcony	0.97 (0.74, 1.28)	1.19 (0.98, 1.45)	1.72 (1.40, 2.10)***	0.97 (0.82, 1.14)	0.92 (0.80, 1.06)	1.20 (1.04, 1.39)*

[1]) Statistics of the final model: likelihood ratio $chi^2 = 4518.856$ df 159 $p < .001$ Nagelkerke $R^2 = 0.367$.
[2]) Statistics of the final model: likelihood ratio $chi^2 = 6374.291$ df 171 $p < .001$ Nagelkerke $R^2 = 0.366$.

actions (7 out of 11 options) and biodiversity actions (9 out of 9 options) had a significant positive impact on the odds of being in the yes-yes category rather than the no-no category, controlling for all the covariates. This is in line with the explored hypothesis and indicates that consumers who gave the affirmative answers were about equally motivated by both concerns. Those who affirmed only purchases of local and seasonal food (yes–no in Table 3) were more often motivated by positive attitudes toward climate actions (6 out of 11 options) than by positive attitudes toward biodiversity actions (2 out of 9 options). Those who affirmed only purchases of organic and local food (no-yes in Table 3) were less often motivated by positive attitudes toward climate actions (2 out of 11 options) and more by positive attitudes toward biodiversity actions (6 out of 9 options). Hence, the mixed answers indicate that substantial numbers of consumers were differently motivated by either climate-related or biodiversity-related concerns.

The covariates also had some significant coefficients in the model; the climate-related and the biodiversity-related covariates had significant positive impacts on the odds of being in the yes-yes category rather than the no-no category, but the size of these coefficients was smaller than those of the action items. Endorsing the seriousness of climate change as a world problem had a very small impact on the odds of all the affirmative responses, but awareness and seriousness of biodiversity loss had almost no impact on the odds in addition to the action items. The other covariates revealed that the odds of being in the yes-yes category (rather than the no-no category) was also affected by other motives than climate and biodiversity. Being female and having a garden/balcony had relatively large positive impacts. In comparison with the reference category of having an age of 65 or higher, the younger age categories were less likely to be in the yes-yes category. Years of education, having children <10 years, life satisfaction and political interest were very weakly positively associated with the odds to be in the yes-yes category. Living in urban area had a very weak negative impact. Regarding

political self-placement, the main distinction was that between those who reported their position (left, center or right) and those who gave no answer (don't know / refusal). The latter had lower odds to be in the yes-yes and yes–no category.

In the final model of the E&S countries, the direction of the significant associations with the odds to be in the yes-yes category was rather similar. The main exception is that the variable rural–urban living indicated lower odds in rural areas. Table 3 also displays that most multiplication factors were somewhat higher than 1 and a number also higher than 1.50. This means that there were many small effects. The likelihood ratio tests for the significance of each variable's contribution to the model (not shown) reveal that three variables were not significant in either group of countries (insulated home, changed energy supplier, bought low energy home). One action item was significant, but in the other direction (lower than 1): those who reported the installation of a renewable energy installation were more likely to be in the no-no category (ns in NW countries, $p < .05$, E&S countries). These items were relatively unpopular, as indicated in Table 2.

4. Discussion

This study aimed to combine the two branches of Eurobarometer research that address climate-related and biodiversity-related opinions and actions, respectively. The big issue is the necessity to increase connections and complementarities among the EU food policy, climate policy and nature conservation policy (European Commission, 2020). The necessary integration makes it important to emphasize that the historically grown differences between "brown" and "green" policy approaches correspond, at a psychological level, to basic differences in attitudes (toward environmental protection actions and toward nature protection actions, respectively), which are, nevertheless, substantially positively correlated (Kaiser et al., 2013). The contribution of the present study is to demonstrate how these different attitudes can work for those domains of human behavior that has repercussions for both climate change and biodiversity loss, such as food consumption practices (Jamison, 2003; Vogt, 2007). The study focused on the two Eurobarometer questions about buying local and seasonal food (to fight climate change) and about buying organic and local food (to protect biodiversity and nature). Consistent with the exploratory hypothesis, consumers who were motivated by positive attitudes toward both climate actions and biodiversity actions were more likely to affirm both options. Consumers who were differently motivated by either climate-related or biodiversity-related concerns were more likely to affirm only one of the options. The results indicate that climate-related and biodiversity-related attitudes can work in parallel to guide food consumption practices activities with different environmental repercussions.

Although the paper did not focus on country differences, it is clear that many variables, in particular those related to climate change, had higher levels in the NW part of Europe. This reflects the influence of higher levels of welfare and a longer history of environmental awareness and action (Rootes, 2004). In both parts of Europe, the sets of climate-related and biodiversity-related actions had the largest impacts on the odds of affirming both food options, although the impacts of individual items were relatively small. Importantly, not all the reported actions made a significant contribution to the model. Some actions, such as "insulated home better" or "bought a low energy home" may have been influenced more by practical issues than by environmental attitude. A deviating item was "having installed equipment to generate renewable electricity", which may have been affected by government subsidies for solar panels. Other work also notes that specific energy-related actions taken by consumers in the climate change mitigation process show different determinants (Davidescu et al., 2020). That the perceived seriousness of climate change or biodiversity loss did not show more impact may be due to limitations of this type of question (rating scales) in revealing high levels of environmental concern (Urban, 2016).

The sections that follow discuss the relevance of the results in the context of current insights into environmental and social motives for pro-environmental food choices. In addition, limitations of the study are discussed.

4.1. Environmental motives for pro-environmental food choices

The results may be relevant also to the study of other food-related options with environmental repercussions than the options of buying local or organic food, such as choices to partially replace animal proteins with plant-based ones. However, a crucial point is that the results should not be interpreted as evidence that it makes sense to simply increase the number of environmental issues that consumers may relate to their food choices. Adding yet another issue to a person's list of issues to be concerned about does not further affect the strength of a message, if all issues belong to the same category (Eagly & Chaiken, 1993). That is why the distinctive correlations between the climate-related and biodiversity-related attitudes and the food-related practices may open new perspectives. Many recent behavioral studies were focused on the relationship between climate change concerns and less meat eating, both correlational (Whitmarsh et al., 2011; de Boer, Schösler, & Boersema, 2013; Stoll-Kleemann & Schmidt, 2017) and experimental (Spaargaren, van Koppen, Janssen, Hendriksen, & Kolfschoten, 2013; Brunner, Kurz, Bryngelsson, & Hedenus, 2018; Jalil, Tasoff, & Bustamante, 2020). The present study suggests the potential of concerns about biodiversity loss for also motivating diet changes, because this topic has received much less attention. However, several studies show significant correlations between adult gardening (home gardening or participation in urban gardening) and higher intakes of fruits and vegetables and, to a lesser extent, reducing intakes of processed foods and meat, although the research does not allow causal interpretations (Freeman et al., 2012; Garcia, Ribeiro, Germani, & Bógus, 2018; Beavers, Atkinson, & Alaimo, 2020; Kegler et al., 2020).

Hence, more research is necessary to become more specific about whether and when climate- and biodiversity-motivated consumers are willing to replace animal-based protein with plant-based protein in their meals. As reducing the environmental repercussions of food choices may have the status of a background goal, this requires special consideration when designing intervention studies. The literature suggests three ways to facilitate the influence of a background goal on consumer decisions, one of which may easily backfire (Aspara, Chakravarti, & Hoffmann, 2015). The first way is to subtly remind a person of the particular goal (e.g. eating in an environmentally friendly way) that might be satisfied by choosing one of the alternatives. Non-food-related laboratory experiments show that this approach can work if the reminders are subtle enough (Aspara et al., 2015). However, providing explicit reminders of the background goal (the second way) is likely to create a backlash effect (Aspara et al., 2015). The third way is that the influence of a background goal on consumer decisions is facilitated by ensuring that popular focal goals (e.g. getting healthy and tasty food) are already likely to be achieved. In that case, a background goal (e.g. food that is also environmentally friendly) may gain more importance (Fishbach & Dhar, 2005; Unsworth, Dmitrieva, & Adriasola, 2013). Therefore, it is crucial to create an intervention context that is supportive of legitimate, culturally appropriate, healthy and tasty diet changes, such as a food environment with affordable and readily available plant-based options (Jalil et al., 2020; Päivärinta et al., 2020; Vermeir et al., 2020; de Boer & Aiking, 2021).

4.2. Additional notions: behavioral spillover and green identity

In general terms, the results reflect how the adoption of one action can be associated with the probability of adopting another action, provided that both are related to the same overarching or interrelated goals (environmental protection or nature protection). This is a much debated issue in the literature on pro-environmental behavior, because it may

involve topics such as potential spillover effects of a behavioral intervention to other behaviors, which can have significant policy implications (Thomas & Sharp, 2013; Truelove, Carrico, Weber, Raimi, & Vandenbergh, 2014; Maki et al., 2019; Henn, Otto, & Kaiser, 2020; Wolstenholme, Poortinga, & Whitmarsh, 2020). In this context, several factors other than attitudes may play a role, such as the person's need for integration and for developing a particular lifestyle or identity. In relation to food consumption, for instance, Jamison (2003) suggests that eating green can become an important part of one's identity and a way to internalize ecological principles and values. Similarly, gardening and various forms of ecological craftsmanship can provide meaning to a contemporary, fragmented lifestyle (Jamison, 2003).

According to the literature, the notion of a green identity is attractive to some people (Whitmarsh & O'Neill, 2010; Van der Werff, Steg, & Keizer, 2014), although it is basically a very complex concept (Jamison, 2003). Combining different eco-friendly goals or lifestyles often requires compromises or trade-offs, such as in the case of climate change mitigation and choices of organic food (Saxe, 2014). Moreover, identity-formation is a social process, in which antagonistic elements and conflicts are inevitable (Brekhus, 2008). Indeed, other people appear to distinguish themselves from specific environmental groups that demonstrate, as they see it, deviating normative positions, e.g. "tree huggers" (Shirani, Butler, Henwood, Parkhill, & Pidgeon, 2015; Dubuisson-Quellier & Gojard, 2016). A recent study shows that some green individuals effectively concealed their green identity when interacting with non-green others, particularly when these others were close friends or relatives (Perera, Auger, & Klein, 2018). For policy makers, therefore, it is important to keep in mind that many people are willing and able to combine, in a positive way, different eco-friendly goals, but that they do not want to deviate too much from what they see as normal.

4.3. Social motives for pro-environmental food choices

The analysis confirmed that pro-environmental actions are not necessarily motivated by environmental concerns as such (Gifford & Nilsson, 2014). The regression model showed many very small positive coefficients of other variables, which suggests a diffuse process into the direction of more pro-environmental food choices. Several variables indicate that consumers might have social motives for these choices. Their motives may result from early socialization experiences to be other-oriented and socially responsible (Zelezny, Chua, & Aldrich, 2000; McCright & Xiao, 2014), or later socialization experiences to be concerned about overall social welfare (Meyer, 2015), which may then influence pro-environmental behavior. Early socialization experiences may partly explain gender differences in pro-environmental behavior (e.g., because females tend to provide more care than males), although gender effects change over time, and vary by location and type of pro-environmental behavior (McCright & Xiao, 2014). Variables that may indicate higher concerns about overall social welfare are years of education and level of political interest (Meyer, 2015; Davidescu et al., 2020), which may also point to a higher level of information on complex issues. Both variables were associated with pro-environmental food choices. This did not apply to political ideology, which played a role in studies that focused on levels of public concern (Duijndam & van Beukering, 2020), showing a negative influence of a right-wing political ideology and a higher age. What mattered for the food choices was not the difference between left, center and right positions, but mainly that between participants with and without an answer to the question. The latter were less likely to make pro-environmental food choices. That the older participants were more likely to buy local food than the younger ones cannot be attributed to environmental motives. A separate analysis (not shown) confirmed that the younger participants demonstrated more concern about the seriousness of climate change than the older ones; however, they may have been less likely to buy local food due to inconvenience in shopping for local food (Feldmann & Hamm, 2015).

5. Limitations

An important limitation is that the study is based on a secondary analysis, which means that the work is limited to the questions asked by the original investigators, guided by EU policy development. On the one hand, this is a strength, because it might be assumed that the questions are policy-relevant. On the other hand, it is a weakness in that the set does not include the usual explanatory variables associated with buying local food (e.g. perceived food quality, freshness, inexpensiveness, the benefits for the local economy (Feldmann & Hamm, 2015)) and organic food (e.g. health and purity concerns (Roininen et al., 2006; Schösler, de Boer, & Boersema, 2013; Ditlevsen et al., 2019)). Also the number of action items was too low for scale calculations. Clearly, more research is necessary into the psychological, cultural, and economic meaning of the various climate- and biodiversity-related actions to assess whether they can be representative of a certain attitude. It is also important to study how the concept of biodiversity loss can be made more familiar among consumers. A strength of the study is that the analyses were carried out separately in two large—but economically and culturally different—groups of countries with similar results.

6. Conclusion

The new F2F strategy aims to better integrate a whole range of policy domains, including food production, climate change and biodiversity loss. The present study shows that, at an individual level, the traditional "brown" and "green" policy areas correspond to a person's basic attitudes towards environmental protection actions and toward nature preservation actions, respectively. The study demonstrates how these attitudinal linkages can, independent of each other, be related to improved food consumption practices, enabling individuals to better play their parts in fighting climate change and biodiversity loss simultaneously, which opens up interesting new perspectives for policy-makers, businesses and consumers.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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