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Original Research Article

The Sustainability Spillover: Uncovering the Link Between Informal Elder Care and Eco-Conscious Behaviors Across the European Union

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Abstract

Background and Objectives: This study explores the association between informal caregiving for older adults and environmentally sustainable behaviors across the 27 European Union countries, aiming to identify how the gendered and domestic nature of environmentalism relates to senior care.

Research Design and Methods: Data from 41,742 respondents aged 16–74 were analyzed from the Survey of Gender Gaps in Unpaid Care, Individual and Social Activities, and conducted by a scientific consortium in 2022. Frequency of sustainable behaviors was measured across 10 indicators. Multilevel mixed-effects linear regressions examined associations between caregiving and sustainable behaviors, adjusting for demographic, socioeconomic, and attitudinal covariates.

Results: Informal caregivers engaged in eco-friendly actions significantly more frequently than noncaregivers across all 10 sustainable-behavior indicators ($p < 0.001$). The "caregiver effect" was strongest for sustainable-consumption choices like buying eco-friendly ($\beta = 0.16$), fair-trade ($\beta = 0.15$), and used products ($\beta = 0.17$), and weaker for household practices such as recycling ($\beta = 0.05$) and mindful resource consumption ($\beta = 0.06$). Caregivers attained higher composite environmental behavior scores (33.93 ± 8.23) than noncaregivers (31.88 ± 8.00; $p < 0.001$). This association remained robust after adjusting for gender, age, education, employment, household size, attitudes, and other covariates. Caregiving had the strongest association with buying used items ($\beta = 0.20$) and eco-friendly products ($\beta = 0.14$). Country-level analyses revealed consistent caregiver versus noncaregiver differences, with the largest gaps in Southern and Eastern Europe.

Discussion and Implications: This is the first large-scale cross-national study that demonstrates a consistent association between older-adult caregiving and a wide range of environmentally sustainable behaviors. Results suggest the experience of caring for a vulnerable family member is closely related to a broader sense of social and environmental responsibility. Caregivers' heightened engagement in sustainable consumption positions them as potential early adopters and change makers. Findings highlight new avenues for environmental education and caregiver support initiatives that synergistically promote interpersonal and environmental care.

Keywords: Environmental attitudes, Ethic of care, Informal caregiving, Sustainable behaviors, Multilevel modeling

Translational Significance: This large-scale, cross-national study breaks new ground by demonstrating a robust and consistent association between informal caregiving for older adults and the adoption of environmentally sustainable behaviors across 27 European Union countries. To our knowledge, it is the first study to reveal that caregivers engage in eco-friendly actions more frequently than noncaregivers across a wide range of indicators, even after adjusting for an extensive set of covariates. Results suggest that the experience of caring for a vulnerable family member may spill over into broader domains of social and environmental responsibility, extending the literature on the "ethic of care."

Environmentalism has made its way from the political margins to the front of the global political stage. In the process, policy-making is no longer limited to the public sphere, to industry regulations, or international agreements. It has entered the private sphere, promoting eco-friendly everyday life from energy conservation and waste management to "buying local" (Chatterton & Pickerill, 2010; Dombroski, 2016). It is generally agreed that individuals' everyday practices, changes

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in habits, and even sacrifices of comfort may prevent further environmental decline (Brandenstein et al., 2023; Long et al., 2023).

A growing body of research has developed to explore the demographic and socioeconomic variables that are associated with individual eco-friendly attitudinal and behavioral change. More knowledge is needed, however, as to the implications of the intersection of demography, economy, and opportunity on individuals' eco-friendly lives, including the consideration of gender-specific differences in this regard. Specifically, more knowledge is needed to illuminate the peculiar implications of household roles and division of labor for the ability to engage in environmental everyday life activity and to understand how carers may be affected by environmental-friendly policies (e.g., limiting the use of individual means of transportation). A better understanding of these aspects is attained by recognizing that the person responsible for caregiving at home is also the most likely candidate for caring for everyday household environmentalism (Cousins, 2021).

Environmentalism of Everyday Life

Mainstreaming environmentalism translates into the privatization and individualization of ecological responsibility (Cousins, 2021). The effort to counter global warming and mitigate the effects of pollution and loss of ecosystems translates into a series of everyday individual practices (Chatterton & Pickerill, 2010; Dombroski, 2016). The study of everyday life environmentalism includes the investigation of recycling, consumption reduction, organic cooking, reusing, and other activities performed by individuals in households (Brandenstein et al., 2023; Kusturica et al. 2021; Onel & Mukherjee, 2014; Streimikien & Balezentis, 2015).

Everyday environmentalism is rooted in consumer culture. Although waste management and conservation may be construed as nonconsumerist, these activities go hand in hand with buying—from purchasing reusables to light bulbs or investing in solar panels and green housing (Arroyo & Carrete, 2019; Leelakulthanit, 2014; Senturk & Dumludag, 2022). Therefore, environmental research often metamorphoses into consumer-behavior research in causes such as consumption reduction, buying organic or locally, buying green, and buying reusable instead of single-use items or second hand instead of new (García-Salirrosas et al. 2023; Geng et al., Yang, 2023; Senturk & Dumludag, 2022; Tan et al., 2022; Uddin & Khan, 2016; Wojciechowska-Solis & Barska, 2021). Another line of research explores environmental spending, such as willingness to spend more on responsible tourism or on ecological projects (Halkos & Matsiori, 2017; Puciato et al., 2023).

By and large, awareness of the ecological crisis and environmentalist attitudes are associated with behavior or intended behavior (Bimbo et al. 2021; O'Connor et al., 2021; Whitley et al., 2023). Yet it is opportunities, specifically material and social resources, that shape the likelihood that attitudes or intentions will translate into actual behavior (Halkos & Matsiori, 2017; Moser & Kleinhückelkotten, 2018).

Socioeconomic Status and Everyday Practical Environmental Behavior

Higher education is associated with environmental awareness and attitudes (Whitley et al., 2023; Wojewódzka-Wiewiórska et al., 2022). Streimikien and Balezentis (2015) found an association between higher education and willingness to pay more for renewable energy. Socioeconomic factors mediate between attitudes and acting upon attitudes through eco-friendly consumption, public transportation, or reduced consumption (Aral & Lopez-Sintas, 2020). Similarly, education is positively associated with eco-friendly behaviors (Gkargkavouzi et al., 2018; Kusturica et al. 2021; Sánchez et al., 2016; Vasco et al., 2022). Higher education and occupational status are found to be associated with buying local (Bimbo et al. 2021). Socioeconomic status in general is associated with eco-friendly practices in everyday life (Long et al., 2023). Because caregivers tend to be, on average, less affluent than noncaregivers, these findings may infer that caregivers may be less engaged in environmentally friendly practices than are others (Bauer & Sousa-Poza, 2015).

Conversely, Senturk et al. (2022) found no correlation between education and transition to multiuse bags, as they did with regard to gender, income, and employment. Therefore, it is not surprising that when it comes to environmentalism in everyday life, which requires change in spending, higher earners seem more willing to revise consumption patterns or spend in support of causes such as restoration of marine ecosystems, sustainable hotel services, or renewable energy (Leelakulthanit, 2014; Musova et al., 2021; O'Connor et al., 2021; Puciato et al., 2023; Streimikien & Balezentis, 2015).

When households need to consider purchases such as solar panels or components of green housing, economic cost and value becomes an important consideration (Arroyo & Carrete, 2019; Rosner et al., 2022). A study in the United Arab Emirates suggests that combined economic incentives may motivate environmentally aware households to recycle and reuse waste (Abushammala & Ghulam, 2023). Recent research by the European Commission (2024) highlights the effectiveness of combining traditional economic instruments with innovative behavioral interventions to promote pro-environmental behaviors. Their meta-analysis of experimental studies found that policy mixes, particularly those combining nudges and monetary incentives, tend to outperform single interventions in fostering sustainable actions. This approach aligns with the EU's ambitious climate targets, including a 55% reduction in greenhouse gas emissions by 2030 compared to 1990 levels. These findings underscore the importance of multifaceted policy approaches in achieving significant behavioral changes necessary for meeting the EU's climate objectives.

The Demography of Environmentalism in Everyday Life

The body of research on demographic variables associated with environmental practices focuses on gender, age, and familial status. Women exhibit higher awareness of and concern about environmental and nature issues across studies, countries, and topics (Abushammala & Ghulam, 2023; García-Salirrosas et al. 2023; Li et al., 2022; Tahal & Formanek, 2022; Wojewódzka-Wiewiórska et al., 2022). Female respondents tend to report higher levels of eco-friendly practices, especially green consumption (Gkargkavouzi et al., 2018; Martins et al., 2021; Musova et al., 2021; Onel & Mukherjee, 2014; Shi et al., 2022; Tan et al., 2022). For example, women are more willing to give up single-use items (Li et al., 2022) and a higher proportion of women on corporate boards

usually leads to a stronger organizational commitment to environmental policies (Carvajal et al., 2022). Studies that examine marital status also find a gender effect in favor of women (Senturk & Dumludag, 2022).

Environmentalism, practical or attitudinal, is associated with generational change. Younger persons have been found to be more likely to exhibit higher awareness in this regard than older persons (Abushammala & Ghulam, 2023; Tahal & Formanek, 2022; Yeonsoo & Giyeon, 2023), to report higher levels of eco-friendly behaviors (Bimbo et al. 2021), and to support environmentalist political parties (Whitley et al., 2023). Some authors, however, pinpoint a higher tendency among older persons to save water and energy and avoid food waste (Yeonsoo & Giyeon, 2023). Furthermore, when recycling is a public standard, there are no differences between older and younger adults in recycling behavior (Yeonsoo & Giyeon, 2023).

Informal Caregiving and Everyday Environmentalism

In contrast to the wealth of evidence on the association between environmentalism and household-related activities, the binomial of environmentalism and informal caregiving—the daily routine of compassionate care for individuals with varying support needs, including young children, older adults, and family members with health conditions—has been much less investigated. Existing research has been overwhelmingly focused on care provided in the context of parenting for younger children that is carried out in kin relationships (Godin & Langlois, 2021). Parents may be considered more likely to practice everyday environmentalism as a manifestation of greater altruism and concern for the future of their offspring (Migheli, 2021). Such research, however, often leaves the gender division of care unaddressed. Yet, according to Cousins (2021), eco-friendly everyday environmentalism simply adds to women's existing familial and household responsibilities, reproducing a gendered division of labor at the household level. For example, household waste management, household energy conservation, household food purchase and preparation, and household planning and consumption are, one may argue, simply another facet of the ever-growing volume of routinized unpaid familial and emotional work.

Practical environmentalism, much like caring for one's family, is also gendered. Many survey respondents tend to perceive environmentalism and environmental activism as feminine, and some authors even suggest that this deters men from adopting more eco-friendly practices (Desrochers & Zelenski, 2023; Swim et al., 2020). Western thought, too, associates the maternal with the natural in a nexus that lies at the heart of the essentialist construction of the feminine. So strong is this association that ecofeminism, as a body of thought, claims a unique feminine take on the environment rooted in women's essential primordial bond with the soil. Thus, some scholars attribute women's activism against polluting industries to their compassionate responsibility for their children (Hallum-Montes, 2012; Martins et al., 2021).

Further, studies identify a gendered division of environmental labor between the private and the public spheres. More women than men engage in privatized, household-related environmental practices (Trelohan, 2022; Xiao & Hong, 2010; Yates et al., 2015). As for public environmentalism, such as memberships in or donations to organizations, Yates et al., 2015, using American public-opinion data, found that men reported higher levels of public engagement in environmentalism, controlling for ideology and ecological concerns. Others did not find gender differences in public environmental activity (Trelohan, 2022; Xiao & Hong, 2010).

The relationship between caregiving and environmental behaviors is complex and potentially contradictory. A study among first-time parents reports neither gender differences in environmental ideology nor a dramatic upheaval in environmental attitudes after first birth (Milfont et al., 2020). This suggests that the mere existence of dependent family members may not be the primary factor influencing eco-friendly behaviors. Instead, it may be the ongoing domestic responsibilities associated with caregiving that more significantly affect environmental practices.

However, the nature of this impact is not straightforward. On one hand, the daily management of household tasks could lead to increased awareness and implementation of eco-friendly domestic behaviors. On the other hand, caregiving is a time-consuming activity, and the time pressure felt by caregivers may limit some environmental-friendly behaviors, such as recycling or using public transportation in the context of care.

Informal caregiving lies at the intersection of many, and sometimes conflicting, demands from family members in general and from women, as primary caregivers, in particular. The individualization and domestication of environmentalism may reshape societal expectations and personal interpretations of effective caregiving. Although studies on domestic environmentalism and caregiving tend to focus on parents and parenting (Dombroski, 2016), knowledge about its relation with caregiving for older family members is limited.

Given the increasing worldwide trend of population aging, it is urgent to understand how the domesticated gendered nature of environmentalism relates to and connects with care of older adults. This includes exploring whether it is possible to parse caregiving among different types of family members, identifying the implications of caregivers' environmental engagement in everyday practice on their caregiving involvement, and examining how caregivers may be affected in the future by different environmentally friendly policies, possibly from a cross-national perspective.

Our study aims to address this knowledge gap by focusing specifically on caregivers of older adults and their engagement with environmental behaviors. This approach will allow us to disentangle the complex relationships between caregiving responsibilities, gender roles, and environmental practices in the context of care for older adults.

This study focuses on caregivers of older adults, reflecting the distinctive challenges posed by an aging population. Older adults are often affected by chronic health issues and functional limitations that increase their dependence not only on family members but also on extended nonkin networks (e.g., neighbors). Informal caregivers thus play a critical role, balancing their caregiving responsibilities with daily environmental practices. Similarly to parenting for young children, informal caregivers of older adults may also be driven by altruism in their environmentalism, but in a more general way, and not necessarily in relation to the future well-being of their descendants, as parents are. By focusing on this group, we highlight how the older caregiving experience may shape eco-conscious behaviors, driven by a heightened ethic of care and responsibility that extends beyond interpersonal support

and concern for the future of one's own offspring and kinship relationships typical of other care contexts.

Conceptual Framework

This study is grounded in a contemporary understanding of informal caregiving within the context of environmental sustainability behaviors. Informal caregiving is defined as the provision of unpaid care to individuals who need assistance with daily activities due to illness, disability, or aging. This care is typically provided by family members, friends, or neighbors outside of formal healthcare or social service systems (Schulz & Eden, 2016). The unpaid nature of this care and the personal relationship between the caregiver and care recipient distinguish it from formal caregiving (Revenson et al., 2016).

Informal caregiving often involves a complex set of tasks and responsibilities that can affect various aspects of the caregiver's life, including their daily routines, social interactions, and decision-making processes (Greenfield et al., 2018). This study posits that these impacts may extend to the domain of environmental behaviors, drawing on the concept of the "ethics of care" (Gilligan, 1993; Tronto, 2020). This ethical framework suggests that the experience of providing care may foster a broader sense of responsibility and interconnectedness, potentially influencing how caregivers interact with their environment.

Sustainability behaviors, in this context, encompass a wide range of actions aimed at reducing one's ecological footprint. These include consumption choices, waste management practices, energy use, and transportation decisions (Stern, 2000). By examining the relationship between informal caregiving and these behaviors, this study seeks to uncover potential spillover effects between interpersonal care and environmental stewardship.

This conceptual framework allows for an exploration of how the unique experiences and perspectives gained through informal caregiving might translate into increased awareness and action in the realm of environmental sustainability. It also provides a basis for understanding how caregiving responsibilities might interact with other factors known to influence environmental behaviors, such as socioeconomic status, education, and demographic characteristics, thus going beyond concerns for the future well-being of one's offspring that are present in some studies on caregivers of young children (Godin & Langlois, 2021).

Method

Main Study Design and Participants

The results presented in this article are harvested from the Survey of Gender Gaps in Unpaid Care, Individual and Social Activities project (EIGE/2021/OPER/10), carried out between November 2021 and December 2022 by Eurocarers (Belgium) in consortium with the European Centre for Social Welfare Policy and Research (Austria), the National Institute of Health and Science on Aging-IRCCS INRCA (Italy), and IPSOS GmbH (Germany).

The overall objective of the study, commissioned by the European Institute for Gender Equality (EIGE), was to support the conceptual revision of the "time domain" of the Gender Equality Index (measuring gender equality in relation to care responsibilities, household tasks, and participation in individual and social activities; EIGE, 2022) and to fill data gaps in some of the European Union's (EU) policy priority areas by collecting EU-wide survey data on gender gaps in unpaid care and in individual and social activities.

The specific objectives of the entire EIGE study were twofold: (1) to strengthen the Gender Equality Index and its capacity to capture changes in the domain of time in a more conceptually sound, coherent, and regular way and (2) to support the monitoring of both the EU Gender Equality Strategy 2020–2025 (European Commission, 2020a) and the European Care Strategy (European Commission, 2022c) in their priority areas on closing the gender-care gap and strengthening long-term care and early-childhood education and care, gender equality, and social fairness.

To this end, the authors of the survey collected data on gender gaps in unpaid care and individual and social activities in order to understand different uses of time in such activities by European women and men aged 16 and older as well as the factors that hinder or help their participation. An additional aim concerned informing possible policy responses on the basis of data collection and analysis.

In total, 60,716 respondents, aged 16–74, were interviewed across the 27 EU Member States using a quantitative approach. The fieldwork was carried out between August and October 2022.

Sampling and Data Collection

To ensure homogeneity in data collection, Computer Assisted Web Interviews (CAWI) were chosen as the preferred methodology and were used for gathering data in all countries except two (Malta and Luxembourg). Samples for CAWI surveys come from established online access panels for which panelists are recruited through a variety of different channels (social media, media agencies, etc.) before the survey (EIGE, 2023). Robust access panels, however, do not exist in all countries; therefore, residents of Malta and Luxembourg, where Random Digit Dialing methodology was invoked to build the sample, were interviewed via computer assisted telephone interviews, which included both landline and mobile numbers.

Sample size differed from country to country. The allocation of sample size followed the logic of country size, namely, the more populace the country, the larger its sample. In most countries, the sample was $n = 1{,}000$ or large (up to 4,000 in France, Germany, Italy, Poland, and Spain). In the others—Cyprus, Malta, and Luxembourg—the target sample size was $n = 500$.

Age, gender, and region (NUTS III) were used as hard quotas. Monitoring quotas included respondent's education (ISCED classification), household composition, number of children in the household, and degree of urbanization. Target quotas reflected the stratification of the category for the population of a Member State as presented in the Eurostat database (2020). The survey targeted respondents from 16 to 74 years of age. In some countries (Austria, Belgium, Spain, Lithuania, Luxembourg, Latvia, Malta, and Poland), a small number of respondents aged 75+ were allowed to take part in the survey in order to fill quotas for the 65–74 age group. In Romania, undercoverage issues related to limited internet penetration and lack of digital literacy resulted in a reduced age range (16–64 years). Quotas were filled in all countries with deviations no larger than 10%–15% (a standard practice in online surveys; EIGE, 2023; Yang & Banamah, 2014). Bulgaria, Cyprus, and Greece were the only Member States

where reaching targets proved difficult; therefore, their quotas had to be relaxed further. These deviations were adjusted in the weighting process.

The data-collection tool was a questionnaire, developed on the basis of: (1) a conceptual framework (based on a literature review and mapping of existing surveys on time use and unpaid work in the EU and beyond) to measure gender gaps in unpaid care and individual and social activities, specifically developed for this study; (2) consultation with relevant stakeholders (e.g., the EU's Directorates for Employment and for Justice, the European Trade Union Confederation—ETUC, and the EU Agency for the Improvement of Living and Working Conditions: Eurofound); and (3) cognitive testing.

Such a questionnaire was designed for a 15-min survey and was prepared in order to comply with the general rules and principles of Data Protection Regulation (EU) 2018/1725 (GDPR), following (where feasible) Eurostat guidelines on standardized key social variables (European Commission, 2020b) and adopting (wherever possible) tried-and-tested questions from Eurostat, Eurofound, the EU Agency for Fundamental Rights (FRA), and EIGE surveys.

The survey questionnaire focused on five key thematic areas identified by the conceptual framework that underpinned the survey and included, as specific sections of the data-collection tool, informal caregiving for older adults and people with disabilities; informal childcare; housework; leisure; and volunteering, charitable, and political activities. Prevalence of different activities, aggregated time spent, and satisfaction with the time spent on each activity were dimensions covered in each thematic area, while other dimensions (e.g., distribution of specific tasks between partners in the household; work-life-balance questions, etc.) were covered to a different extent. The questionnaire also included the following sections: general information (sociodemographic questions and items that solicited respondents' opinions and views about attitudes and roles of men and women in society); means of transport, digitalization, and environment; and other information (e.g., questions about respondent's limitations in activities due to health problems, self-perceived health status, income and financial contribution to the household, etc.).

Respondents were asked to give electronic consent before filling in the questionnaire. All responses were collected anonymously, in compliance with the EU Regulation No. 679 of the European Parliament and of the Council of April 27, 2016, and the Helsinki Declaration (2013).

Sample Selection: Exclusion Criteria

The total EIGE project sample numbered 60,716 participants. The exclusion criteria for the present study were the following:

- Participants with a missing answer regarding provision of informal care: –1,185;
- Participants with missing values in age of main recipient of informal care: –441;
- Exclusion of participants with missing values in frequency of sustainable behaviors: –10,765;
- Exclusion of participants providing informal care to people aged less than 65 years: –5,008;
- Exclusion of participants with missing values in main confounders: –1,575.

The subsample selected for this study, after we applied the above exclusion criteria, comprised 41,742 individuals who are included in the following analysis.

Outcomes and Dimensions

Outcome variables

Outcome variables of the study were respondents' answers to the following dimensions/sub-questions, related to the following environmentally friendly behavior: "There is much debate today about the impact of human society on the global environment. Generally thinking about your personal consumption and behavior, how often.…:

- Do you avoid plastic and/or disposable/single-use products?
- Do you recycle?
- Do you avoid animal products?
- Are you using low carbon-emission modes of transport (cycling, public transport, car-pooling instead of your personal car)?
- Do you buy sustainable or eco-friendly products and services?
- Do you buy fair-trade products and services?
- Do you buy used instead of new items (e.g., secondhand clothes, used furniture)?
- Do you prioritize seasonal and local food products?
- Do you pay attention that products or packaging are recyclable or biodegradable?
- Are you mindful of your consumption of natural resources (water, electricity, and heating)?"

Answers to the options of each dimension/subquestion were: daily; several times weekly; several times monthly; less often; never.

To build a Score of Environmentally Sustainable Behavior (SESB), the dimensions/sub-questions were coded in the following way: 1 = "never"; 2 = "less often"; 3 = "several times a month"; 4 = "several times a week"; 5 = "daily." Afterwards, they were summed in order to yield a score from 10 to 50 (the higher the score, the higher the respondent's environmental behavior).

The grouping variable was coded the following way: not providing informal care at all and providing informal care to people aged 65+. In order to evaluate whether respondents provided informal care, the following question was posed: "Do you provide care for people who, as a result of mental, physical frailty, disability or old age, need help with Activities of Daily Living and Instrumental Activities of Daily Living?"

Covariates

The following were employed as independent and control variables:

- Gender;
- Age (in years);
- Educational level, reclassified into three levels according to the International Standard Classification of Education (ISCED-2011): Low (ISCED 0–2), Medium (ISCED 3–4) and High (ISCED 5+);
- Current professional status (employed, unemployed, retired, other nonworking situation);
- Childcare provision to own children (including stepchildren and adopted children);

- Household size;
- Gender attitudes about roles of women and men, by asking respondents' agreement or disagreement about the following issue, e.g., "Household work should be shared equally." Answer categories were "Strongly agree," "Agree," "Neither agree nor disagree"; "Disagree"; "Strongly disagree";
- Frequency of relying on external services (domestic cleaners, helpers, gardeners, etc.) for housework. Answering options; daily; several times a week; several times a month; less often; never;
- Weekly hours for the following variables: informal care; housework; leisure activities (e.g., cultural activities, holidays, hobbies) excluding sports; health-enhancing (nonwork-related) physical activities (e.g., sports, jogging, cycling) were measured by asking respondents: "How many hours in a typical week are you involved in [name of] activities?" The answer categories were the following 6-hr bands: 1–7 to 8–21 weekly hours; 22–35 to 36–39 weekly hours; 50–70 weekly hours; and 71 or more weekly hours;
- Respondents' limitation due to health problems was assessed by asking: "Are you limited because of a health problem in activities people usually do? Would you say you are…." Answers categories were: severely limited; limited but not severely; not limited at all;
- General health was measured through the question: "How is your health in general?" Answer categories were: very good; good; fair; bad; very bad;
- Weekly hours of sleep were measured by asking: "On average, how many hours do you sleep at night in a typical week?" Answer categories were re-classified in the following: fewer than 5; 5 or 6; 7 or 8; 9 and more;
- Perceived household income was measured by asking: "A household may have different sources of income and more than one household member may contribute to it. Thinking of your household's total monthly income, is your household able to make ends meet…?" Answer categories were: with great difficulty; with difficulty; with some difficulty; fairly easily; easily; very easily;
- Country (EU-27).

Statistical Analysis

For descriptive statistics (Table 1), normality in distribution for continuous variables was assessed via Kernel density estimate (Supplementary Figure S1A) and Standardized normal probability plot (Supplementary Figure S1B), means and standard deviation were reported and statistical significance of comparisons between groups was assessed via unpaired *t* tests. For categorical variables, absolute frequencies and percentages were reported and statistical significance was assessed by Pearson's Chi-square test.

The internal consistency of SESB was evaluated with Cronbach's alpha: Because the scale coefficient is 0.85 (with an average interitem covariance of 0.55), its reliability was good.

As for multivariate analyses (Table 2), a linear regression model was estimated for SESB and 10 ordered probit models for the indicators used to build the score itself. Given the different levels of data, the statistical model had to take into account the existence of a nested structure of individuals in countries (Hox, 1998). Multilevel mixed-effects regressions were estimated in order to allow total variability to be decomposed into primary level (subject-related variability) and secondary level (country variability; Austin et al. 2001).

The multivariate analysis was repeated after a random undersampling for noncaregivers in order to have two balanced groups, as the two groups in the overall sample used for the analysis were highly unbalanced (36,089 noncaregivers, 5,653 caregivers). This allowed us to determine whether our results and significance were biased due to the difference in sample sizes.

The validity of the models was assessed by Wald χ^2 test, while, in order to detect potential multicollinearity issues among covariates, standard error of each coefficient will be evaluated to avoid variance inflation (Supplementary Tables S1 and S2).

A two-tailed p value < .05 was considered significant. The data were analyzed using STATA/MP version 18.0 Statistical Software Package for Windows (Stata Corp, College Station, TX, USA). The survey microdata is publicly available on the GESIS public repository (https://search.gesis.org/research_data/ZA8752?doi=10.4232/1.14218).

Results

Sample Characteristics

As shown in Table 1 (section "Covariates"), caregivers and noncaregivers differ in several characteristics (in all cases to a statistically significant level, with no exceptions). These concern not only "basic" indicators like gender (women overrepresented among caregivers, 54.9% vs 50.9% for noncaregivers, $p < .001$), age (caregivers almost 2 years older than noncaregivers on average, i.e., 47.19 ± 13.98 vs 45.30 ± 15.07, $p < .001$), education (caregivers have a higher proportion possessing advanced education, i.e., 48.8% vs. 44.6%), employment (caregivers more often still active in the labor market, 66.6% vs 62.9%, $p < .001$), and household size (caregivers in slightly larger households) but also more sophisticated ones, like attitudes toward sharing household work (caregivers more prone to more equal sharing, i.e., 60.8% vs 57.6% are strongly agree with this aspect, $p < .001$), childcare (30.4% of caregivers vs 26.3% of noncaregivers care also for their own children, $p < .001$) and external housework (62.9% of caregivers vs 75.3% of noncaregivers have never done housework services, $p < .001$), and amount of time dedicated to housework, leisure, and physical activities (more among caregivers in all categories). Noncaregivers also report, on average, better health conditions (38.7% of noncaregivers vs 29.7% of caregivers report good or very good health, $p < .001$) and fewer health-related limitations (70.3% vs 61.3% are not limited at all, $p < .001$), longer sleep time, and better finances in terms of ability to make ends meet at the household level. As for cross-country distribution of the prevalence of caregiving, caregivers seem to be overrepresented in Southern and Eastern European countries (e.g., Bulgaria, Croatia, Greece, Italy, Lithuania, Portugal, and Romania) and underrepresented especially in Scandinavian and Continental European countries (e.g., Belgium, Denmark, Finland, France, Germany, and Sweden).

Personal consumption and behavior

Moving to the environmental components of the descriptive analyses carried out for this study (Table 1, section "Frequency of Sustainable Behavior"), our first finding from

Table 1. Sample Characteristics

Variable	Total	Noncaregivers	Caregivers of older people	*p* Value
	N = 41,742	*N* = 36,089	*N* = 5,653	
Frequency of sustainable behavior				
SESB (10–50), mean ± *SD*	32.15 ± 8.06	31.88 ± 8.00	33.93 ± 8.23	<.001
Avoidance of plastic and/or disposable/single-use products, *n* (%)				<.001
Never	3,536 (8.5%)	3,172 (8.8%)	364 (6.4%)	
Less often	9,282 (22.2%)	8,177 (22.7%)	1,105 (19.5%)	
Several times a month	10,195 (24.4%)	8,959 (24.8%)	1,236 (21.9%)	
Several times a week	9,987 (23.9%)	8,555 (23.7%)	1,432 (25.3%)	
Daily	8,742 (20.9%)	7,226 (20%)	1,516 (26.8%)	
Recycling, *n* (%)				<.001
Never	1,442 (3.5%)	1,281 (3.5%)	161 (2.8%)	
Less often	4,168 (10.0%)	3,644 (10.1%)	524 (9.3%)	
Several times a month	5,936 (14.2%)	5,181 (14.4%)	755 (13.4%)	
Several times a week	8,165 (19.6%)	7,114 (19.7%)	1,051 (18.6%)	
Daily	22,031 (52.8%)	18,869 (52.3%)	3,162 (55.9%)	
Avoidance of animal products, *n* (%)				<.001
Never	12,952 (31.0%)	11,467 (31.8%)	1,485 (26.3%)	
Less often	11,208 (26.9%)	9,744 (27.0%)	1,464 (25.9%)	
Several times a month	7,335 (17.6%)	6,304 (17.5%)	1,031 (18.2%)	
Several times a week	6,227 (14.9%)	5,235 (14.5%)	992 (17.5%)	
Daily	4,020 (9.6%)	3,339 (9.3%)	681 (12.0%)	
Low carbon-emission modes of transport, *n* (%)				<.001
Never	7,133 (17.1%)	6,297 (17.4%)	836 (14.8%)	
Less often	10,214 (24.5%)	8,918 (24.7%)	1,296 (22.9%)	
Several times a month	7,171 (17.2%)	6,202 (17.2%)	969 (17.1%)	
Several times a week	8,399 (20.1%)	7,188 (19.9%)	1,211 (21.4%)	
Daily	8,825 (21.1%)	7,484 (20.7%)	1,341 (23.7%)	
Buy eco-friendly products and services, *n* (%)				<.001
Never	2,865 (6.9%)	2,576 (7.1%)	289 (5.1%)	
Less often	11,062 (26.5%)	9,789 (27.1%)	1,273 (22.5%)	
Several times a month	13,038 (31.2%)	11,467 (31.8%)	1,571 (27.8%)	
Several times a week	9,192 (22.0%)	7,783 (21.6%)	1,409 (24.9%)	
Daily	5,585 (13.4%)	4,474 (12.4%)	1,111 (19.7%)	
Buy fair-trade products and services, *n* (%)				<.001
Never	4,648 (11.1%)	4,160 (11.5%)	488 (8.6%)	
Less often	12,207 (29.2%)	10,730 (29.7%)	1,477 (26.1%)	
Several times a month	11,754 (28.2%)	10,284 (28.5%)	1,470 (26%)	
Several times a week	8,027 (19.2%)	6,806 (18.9%)	1,221 (21.6%)	
Daily	5,106 (12.2%)	4,109 (11.4%)	997 (17.6%)	
Buy used instead of new items, *n* (%)				<.001
Never	9,285 (22.2%)	8,180 (22.7%)	1,105 (19.5%)	
Less often	16,408 (39.3%)	14,416 (39.9%)	1,992 (35.2%)	
Several times a month	8,349 (20.0%)	7,214 (20.0%)	1,135 (20.1%)	
Several times a week	4,338 (10.4%)	3,597 (10.0%)	741 (13.1%)	
Daily	3,362 (8.1%)	2,682 (7.4%)	680 (12.0%)	
Prioritize seasonal and local food products, *n* (%)				<.001
Never	1,891 (4.5%)	1,703 (4.7%)	188 (3.3%)	
Less often	6,274 (15.0%)	5,585 (15.5%)	689 (12.2%)	
Several times a month	10,779 (25.8%)	9,518 (26.4%)	1,261 (22.3%)	
Several times a week	12,403 (29.7%)	10,776 (29.9%)	1,627 (28.8%)	
Daily	10,395 (24.9%)	8,507 (23.6%)	1,888 (33.4%)	

Table 1. Continued

Variable	Total	Noncaregivers	Caregivers of older people	*p* Value
	N = 41,742	*N* = 36,089	*N* = 5,653	
Mindful of recyclability or biodegrabability of products and packaging, *n* (%)				<.001
Never	4,307 (10.3%)	3,868 (10.7%)	439 (7.8%)	
Less often	9,101 (21.8%)	8,060 (22.3%)	1,041 (18.4%)	
Several times a month	9,447 (22.6%)	8,319 (23.1%)	1,128 (20.0%)	
Several times a week	9,836 (23.6%)	8,445 (23.4%)	1,391 (24.6%)	
Daily	9,051 (21.7%)	7,397 (20.5%)	1,654 (29.3%)	
Mindful consumption of natural resources, *n* (%)				<.001
Never	1,283 (3.1%)	1,131 (3.1%)	152 (2.7%)	
Less often	3,922 (9.4%)	3,470 (9.6%)	452 (8.0%)	
Several times a month	6,254 (15.0%)	5,474 (15.2%)	780 (13.8%)	
Several times a week	8,924 (21.4%)	7,801 (21.6%)	1,123 (19.9%)	
Daily	21,359 (51.2%)	18,213 (50.5%)	3,146 (55.7%)	
Covariates				
Gender, *n* (%)				<.001
Female	21,453 (51.4%)	18,352 (50.9%)	3,101 (54.9%)	
Male	20,289 (48.6%)	17,737 (49.1%)	2,552 (45.1%)	
Age, mean ± *SD*	45.56 ± 14.94	45.30 ± 15.07	47.19 ± 13.98	<.001
Education level, *n* (%)				<.001
Low	5,120 (12.3%)	4,540 (12.6%)	580 (10.3%)	
Medium	17,757 (42.5%)	15,443 (42.8%)	2,314 (40.9%)	
High	18,865 (45.2%)	16,106 (44.6%)	2,759 (48.8%)	
Current situation, *n* (%)				<.001
Employed	26,463 (63.4%)	22,699 (62.9%)	3,764 (66.6%)	
Unemployed	2,456 (5.9%)	2,118 (5.9%)	338 (6.0%)	
Retired	6,544 (15.7%)	5,791 (16.0%)	753 (13.3%)	
Other nonworking situation	6,279 (15.0%)	5,481 (15.2%)	798 (14.1%)	
Household size, *n* (%)				<.001
1	7,208 (17.3%)	6,487 (18.0%)	721 (12.8%)	
2	13,935 (33.4%)	12,169 (33.7%)	1,766 (31.2%)	
3	9,638 (23.1%)	8,153 (22.6%)	1,485 (26.3%)	
4	7,705 (18.5%)	6,564 (18.2%)	1,141 (20.2%)	
5	2,352 (5.6%)	1,967 (5.5%)	385 (6.8%)	
6 or more	904 (2.2%)	749 (2.1%)	155 (2.7%)	
Gender attitudes: Household work should be shared equally, *n* (%)				<.001
Strongly agree	24,230 (58.0%)	20,792 (57.6%)	3,438 (60.8%)	
Agree	12,598 (30.2%)	10,959 (30.4%)	1,639 (29.0%)	
Neither agree nor disagree	3,758 (9.0%)	3,328 (9.2%)	430 (7.6%)	
Disagree	896 (2.1%)	800 (2.2%)	96 (1.7%)	
Strongly disagree	260 (0.6%)	210 (0.6%)	50 (0.9%)	
Childcare: of own children, *n* (%)				<.001
No	22,527 (54.0%)	19,593 (54.3%)	2,934 (51.9%)	
Yes	11,194 (26.8%)	9,474 (26.3%)	1,720 (30.4%)	
Not applicable	8,021 (19.2%)	7,022 (19.5%)	999 (17.7%)	
Frequency of external housework services, *n* (%)				<.001
Daily	1,313 (3.1%)	996 (2.8%)	317 (5.6%)	
Several times a week	1,953 (4.7%)	1,495 (4.1%)	458 (8.1%)	
Several times a month	2,875 (6.9%)	2,364 (6.6%)	511 (9.0%)	
Less often	4,882 (11.7%)	4,070 (11.3%)	812 (14.4%)	
Never	30,719 (73.6%)	27,164 (75.3%)	3,555 (62.9%)	

Table 1. Continued

Variable	Total	Noncaregivers	Caregivers of older people	*p* Value
	N = 41,742	*N* = 36,089	*N* = 5,653	
Weekly hours: involvement in housework activities, *n* (%)				<.001
1–7 weekly hours	16,218 (38.9%)	14,566 (40.4%)	1,652 (29.2%)	
8–21 weekly hours	16,986 (40.7%)	14,615 (40.5%)	2,371 (41.9%)	
22–35 weekly hours	4,575 (11.0%)	3,659 (10.1%)	916 (16.2%)	
36–49 weekly hours	1,329 (3.2%)	1,027 (2.8%)	302 (5.3%)	
50–70 weekly hours	474 (1.1%)	360 (1.0%)	114 (2.0%)	
71 or more weekly hours	434 (1.0%)	322 (0.9%)	112 (2.0%)	
Not applicable	1,726 (4.1%)	1,540 (4.3%)	186 (3.3%)	
Weekly hours: leisure activities, *n* (%)				.033
1–7 weekly hours	20,405 (48.9%)	17,655 (48.9%)	2,750 (48.6%)	
8–21 weekly hours	12,118 (29%)	10,496 (29.1%)	1,622 (28.7%)	
22–35 weekly hours	2,978 (7.1%)	2,532 (7.0%)	446 (7.9%)	
36–49 weekly hours	758 (1.8%)	637 (1.8%)	121 (2.1%)	
50–70 weekly hours	208 (0.5%)	173 (0.5%)	35 (0.6%)	
71 or more weekly hours	93 (0.2%)	79 (0.2%)	14 (0.2%)	
Not applicable	5,182 (12.4%)	4,517 (12.5%)	665 (11.8%)	
Weekly hours: physical activities, *n* (%)				<.001
1–7 weekly hours	21,913 (52.5%)	18,998 (52.6%)	2,915 (51.6%)	
8–21 weekly hours	7,126 (17.1%)	6,113 (16.9%)	1,013 (17.9%)	
22–35 weekly hours	1,373 (3.3%)	1,120 (3.1%)	253 (4.5%)	
36–49 weekly hours	453 (1.1%)	370 (1.0%)	83 (1.5%)	
50–70 weekly hours	180 (0.4%)	135 (0.4%)	45 (0.8%)	
71 or more weekly hours	77 (0.2%)	60 (0.2%)	17 (0.3%)	
I don't do (nonwork-related) physical activities	6,378 (15.3%)	5,608 (15.5%)	770 (13.6%)	
Prefer not to answer	4,242 (10.2%)	3,685 (10.2%)	557 (9.9%)	
Limitation due to health problem, *n* (%)				<.001
Severely limited	2,088 (5.0%)	1,720 (4.8%)	368 (6.5%)	
Limited but not severely	10,818 (25.9%)	8,997 (24.9%)	1,821 (32.2%)	
Not limited at all	28,836 (69.1%)	25,372 (70.3%)	3,464 (61.3%)	
General health, *n* (%)				<.001
Very good	7,369 (17.7%)	6,423 (17.8%)	946 (16.7%)	
Good	19,511 (46.7%)	16,996 (47.1%)	2,515 (44.5%)	
Fair (neither good nor bad)	11,922 (28.6%)	10,133 (28.1%)	1,789 (31.6%)	
Bad	2,542 (6.1%)	2,189 (6.1%)	353 (6.2%)	
Very bad	398 (1.0%)	348 (1.0%)	50 (0.9%)	
Weekly hours of sleep, *n* (%)				<.001
Fewer than 5	775 (1.9%)	651 (1.8%)	124 (2.2%)	
5 or 6	10,339 (24.8%)	8,719 (24.2%)	1,620 (28.7%)	
7 or 8	23,020 (55.1%)	20,220 (56%)	2,800 (49.5%)	
9 or more	2,437 (5.8%)	2,137 (5.9%)	300 (5.3%)	
Prefer not to answer	5,171 (12.4%)	4,362 (12.1%)	809 (14.3%)	
Perceived household income: Household is able to make ends meet … , *n* (%)				<.001
With great difficulty	1,957 (4.7%)	1,569 (4.3%)	388 (6.9%)	
With difficulty	3,790 (9.1%)	3,113 (8.6%)	677 (12.0%)	
With some difficulty	11,085 (26.6%)	9,386 (26.0%)	1,699 (30.1%)	
Fairly easily	9,207 (22.1%)	8,001 (22.2%)	1,206 (21.3%)	
Easily	5,408 (13.0%)	4,793 (13.3%)	615 (10.9%)	
Very easily	2,347 (5.6%)	2,075 (5.7%)	272 (4.8%)	
Prefer not to answer	7,948 (19.0%)	7,152 (19.8%)	796 (14.1%)	

Table 1. Continued

Variable	Total	Noncaregivers	Caregivers of older people	*p* Value
	N = 41,742	*N* = 36,089	*N* = 5,653	
Country, *n* (%)				<.001
Ireland	694 (1.7%)	613 (1.7%)	81 (1.4%)	
Austria	1,495 (3.6%)	1,364 (3.8%)	131 (2.3%)	
Belgium	2,056 (4.9%)	1,835 (5.1%)	221 (3.9%)	
Bulgaria	1,211 (2.9%)	955 (2.6%)	256 (4.5%)	
Croatia	641 (1.5%)	440 (1.2%)	201 (3.6%)	
Cyprus	303 (0.7%)	267 (0.7%)	36 (0.6%)	
Czechia	1,731 (4.1%)	1,519 (4.2%)	212 (3.8%)	
Denmark	1,172 (2.8%)	1,073 (3%)	99 (1.8%)	
Estonia	630 (1.5%)	586 (1.6%)	44 (0.8%)	
Finland	1,543 (3.7%)	1,397 (3.9%)	146 (2.6%)	
France	3,085 (7.4%)	2,836 (7.9%)	249 (4.4%)	
Germany	2,930 (7%)	2,629 (7.3%)	301 (5.3%)	
Greece	1,989 (4.8%)	1,561 (4.3%)	428 (7.6%)	
Hungary	2,061 (4.9%)	1,894 (5.2%)	167 (3%)	
Italy	2,979 (7.1%)	2,432 (6.7%)	547 (9.7%)	
Latvia	636 (1.5%)	575 (1.6%)	61 (1.1%)	
Lithuania	602 (1.4%)	473 (1.3%)	129 (2.3%)	
Netherlands	1,999 (4.8%)	1,728 (4.8%)	271 (4.8%)	
Poland	2,579 (6.2%)	2,181 (6.0%)	398 (7.0%)	
Portugal	2,216 (5.3%)	1,818 (5.0%)	398 (7.0%)	
Romania	2,110 (5.1%)	1,699 (4.7%)	411 (7.3%)	
Slovakia	583 (1.4%)	511 (1.4%)	72 (1.3%)	
Slovenia	746 (1.8%)	641 (1.8%)	105 (1.9%)	
Spain	3,085 (7.4%)	2,586 (7.2%)	499 (8.8%)	
Sweden	1,892 (4.5%)	1,760 (4.9%)	132 (2.3%)	
Luxembourg	461 (1.1%)	436 (1.2%)	25 (0.4%)	
Malta	313 (0.7%)	280 (0.8%)	33 (0.6%)	

Note: SESB = Score of Environmentally Sustainable Behavior.

the collected data is that, of all investigated typologies of sustainable behaviors, the one reported at the highest frequency across both groups (55.7% of caregivers and 50.5% of noncaregivers adopt this behavior daily) relates to mindful consumption of natural resources like water, electricity, and heating, together with the adoption of a recycling behavior occurring on a more frequent monthly basis in both cases (i.e., 69.2% overall). At the opposite end, the environmentally friendly behaviors that are less frequently adopted are avoiding animal products and buying used items (e.g., secondhand clothes or furniture) instead of new ones. All other items are in an intermediate position.

A second core result of this study is the statistically significant difference between results concerning caregivers of older people and those reported for noncaregivers, the former group adopting more environmentally friendly behavior on average. This outcome recurs in all typologies of conduct and consumption investigated in this study, thus suggesting a structural dissimilarity between the two groups in this regard.

These findings are also reflected in a synthetic score that summarizes the results of all 10 behavior typologies considered by this study into one single indicator (i.e., SESB: Score of Environmentally Sustainable Behavior), the value of which revealing that, overall, caregivers are characterized by an environmentally friendlier attitude than that of noncaregivers. Figure 1 shows the SESB values scored by caregivers and noncaregivers (i.e., without the country average), highlighting the (often statistically significant) difference between the two groups according to respondent's country. It may also be observed that caregivers in Eastern and Southern European countries report the highest score and that the only two countries that seem to have environmentally friendlier noncaregivers are among those characterized by the lowest scores (albeit with differences that are not always statistically significant).

The results of the multivariate analyses (Table 2) show, in a first model based on multilevel fully adjusted mixed-effects regressions (Model 1), that the impact of informal care is stronger especially in the case of purchase of eco-friendly and fair-trade products and services, of used items (instead of new ones; $\beta \pm SE = 0.16 \pm 0.02$), and of being mindful of the recyclability or biodegradability of products and packaging together with the purchase of fair-trade products and services ($\beta \pm SE = 0.14 \pm 0.02$). Caregiving seems to be less impactful on aspects such as recycling ($\beta \pm SE = 0.06 \pm 0.02$) and mindful consumption of natural resources ($\beta \pm SE = 0.07 \pm 0.02$); all other items place in an intermediate position. A second

Table 2. Impact of Caring for Older People on Sustainable Behaviors

Frequency of sustainable behavior	Model 1[a] *N* = 41,742		Model 2[a] *N* = 11,306	
	β ± *SE*	*p* Value	β ± *SE*	*p* Value
SESB (10–50)[b]	1.23 ± 0.11	<.001	1.18 ± 0.15	<.001
Avoidance of plastic and/or disposable/single-use products[c]	0.12 ± 0.02	<.001	0.12 ± 0.02	<.001
Recycling[c]	0.06 ± 0.02	<.001	0.05 ± 0.02	.049
Avoidance of animal products[c]	0.08 ± 0.02	<.001	0.06 ± 0.02	.002
Use of low carbon-emission modes of transport[c]	0.10 ± 0.02	<.001	0.08 ± 0.02	<.001
Purchase of eco-friendly products and services[c]	0.16 ± 0.02	<.001	0.14 ± 0.02	<.001
Purchase of fair-trade products and services[c]	0.14 ± 0.02	<.001	0.13 ± 0.02	<.001
Purchase of used (instead of new) items[c]	0.16 ± 0.02	<.001	0.19 ± 0.02	<.001
Prioritize seasonal and local food products[c]	0.13 ± 0.02	<.001	0.14 ± 0.02	<.001
Mindful of recyclability or biodegrabability of products and packaging[c]	0.14 ± 0.02	<.001	0.12 ± 0.02	<.001
Mindful of consumption of natural resources[c]	0.07 ± 0.02	<.001	0.09 ± 0.02	<.001

Notes: SESB = Score of Environmentally Sustainable Behavior; β = unstandardized coefficients; *SE* = standard error.
[a]Model 1 refers to the full sample; Model 2 is the same as Model 1 but with random undersampling.
[b]Multilevel fully adjusted mixed-effects linear regressions.
[c]Multilevel fully adjusted mixed-effects ordered probit regressions.
Source: Own calculations based on the Survey of Gender Gaps in Unpaid Care, Individual, and Social Activities.

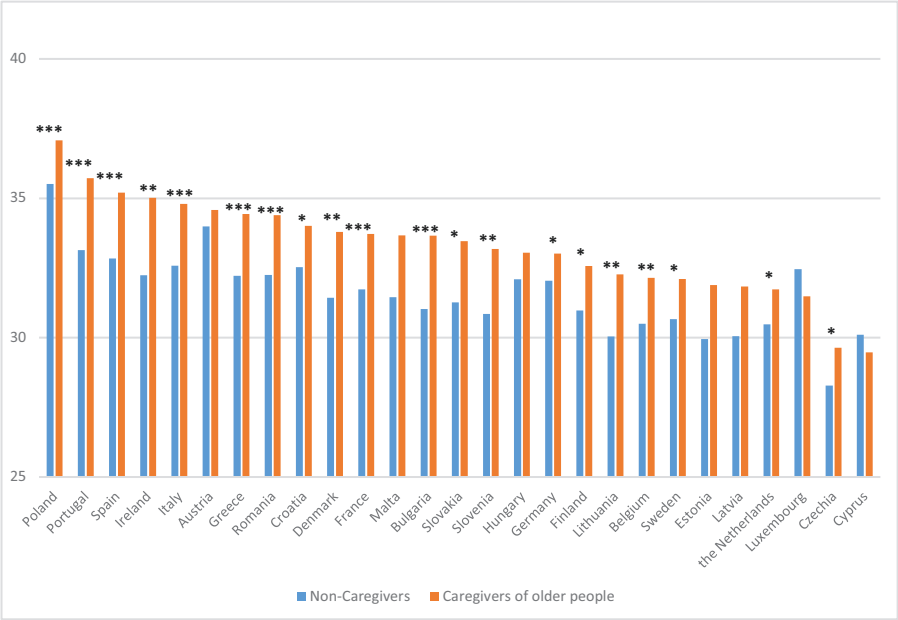

Figure 1. Score of environmentally sustainable behavior (SESB), by country and caregiving role. Asterisks indicate level of statistical significance: *$p \leq .05$. **$p \leq .01$. ***$p \leq .001$. *Source*: Own calculations based on the survey of gender gaps in unpaid care, individual, and social activities.

model (Model 2), based on an undersampling of noncaregivers—performed in order to equalize both groups in the sample (both adjusted for all variables that are significant for Model 1)—shows similar results but a more pronounced impact of the caregiving behavior on the attitude toward buying second-hand (or used) products instead of new ones (β ± *SE* = 0.19 ± 0.02).

Discussion

Caregivers of older people are on average older than caregivers of children and of adults with disabilities, and this implies that they may have been exposed for a shorter period of their lives to environmental debates and awareness campaigns in this regard, and it is therefore important to know whether this has an impact on their environmentally friendly behavior.

This study makes several significant and original contributions to the literature on environmental sustainability and informal caregiving. To our knowledge, it is the first large-scale, cross-national investigation that demonstrates a robust and consistent association between the provision of informal care for older adults and the adoption of a wide range of environmentally sustainable behaviors. The caregiving role for older adults introduces unique demands as well as a profound sense of responsibility. This dynamic can lead to a broader commitment to sustainability, as caregivers extend their ethic

of care into environmentally conscious behaviors which, unlike care for children, may not be completely explained by mere concern for the future of one's offspring. In fact, many caregivers for older adults may not even share kinship ties with the cared-for person. Recognizing elder caregivers as potential environmental stewards allows for more targeted outreach and support, strengthening both caregiver well-being and sustainable practices. Our results reveal that caregivers engage in eco-friendly actions more frequently than do noncaregivers across 10 different indicators spanning everyday activities like consumption choices, use of transportation, and household practices. This "caregiver effect" remains significant even after an extensive set of demographic, socioeconomic, and attitudinal covariates is controlled for, suggesting that it is not merely a by-product of other factors, such as caregivers' lower income fueling the need to reuse products.

This novel finding has important theoretical implications. For example, the literature on the "ethic of care" (Gilligan, 1993; Tronto, 2020) posits that caregiving at the interpersonal level may be associated with a broader sense of interdependence and stewardship. The findings of the present study may indeed suggest that the experience and ethical orientation of caring for a vulnerable family member may spill over into other domains of social and environmental responsibility (Brînduşa, 2019; Maio, 2018). Although previous research has examined the gendered nature of both caregiving and pro-environmental behaviors (Abushammala & Ghulam, 2023; García-Salirrosas et al. 2023; Li et al., 2022; Musova et al., 2021; Onel & Mukherjee, 2014), our multivariate results indicate that the "caregiver effect" transcends gender alone. The fact that active caregiving predicts eco-friendly behaviors even after adjusting for gender and other variables suggests a distinct and underexplored pathway to environmental engagement.

Another original contribution of the study is its differentiation among types of sustainable behaviors. We found that caregiving had the strongest impact on sustainable consumption choices such as buying eco-friendly, fair-trade, and used products, and a weaker influence on household practices like recycling and resource conservation. Use of low carbon-emission modes of transportation, such as public transportation, was also identified among the behaviors strongly associated with caregiving, despite the time pressures that carers face to begin with. This pattern, not previously documented, suggests that caregivers' heightened sense of responsibility is channeled more through their consumer behaviors than through their domestic habits. It aligns with research showing that higher socioeconomic status enables individuals to translate pro-environmental attitudes into eco-friendly purchases (Leelakulthanit, 2014; Moser & Kleinhückelkotten, 2018; Musova et al., 2021). Although this result of our study seems, on the one hand, to partly contradict evidence suggesting that caregivers tend to be characterized by a lower average income, it highlights the potential of caregivers' serving as "opinion leaders" (Katz & Lazarsfeld, 1955) and early adopters of sustainable products and services, a role that has not been previously recognized.

The study uses a novel and large cross-sectional sample of observations, with more than 60,000 respondents and representative of the population across 27 EU countries. This is, to our knowledge, the largest and most geographically diverse sample used in research on caregiving and environmental behaviors to date. The inclusion of a comprehensive set of covariates helps to isolate the unique effect of caregiving and rule out confounding variables. The multilevel modeling approach accounts for the nested structure of the data and provides more accurate estimates of the associations of interest. These strengths enhance the reliability and generalizability of the findings.

In addition to its theoretical and methodological contributions, the study has important practical implications. By identifying informal caregivers as a group that is particularly engaged in sustainable behaviors, it suggests new avenues for environmental education and outreach. Policymakers and advocacy organizations may develop targeted interventions and messaging that frame eco-friendly actions as an extension of the ethic of care exemplified by caregivers. This may help to broaden the appeal of sustainability beyond traditional environmentalist constituencies and tap into the moral motivations of a wider population. Concurrently, it suggests that support services for caregivers may incorporate information and resources on sustainable living in recognition of the potential synergies of these two domains of prosocial behavior. Finally, it strongly hints at possible support of a wide range of environmentally friendly policies among caregivers.

Some limitations of the study should be acknowledged. The cross-sectional design precludes causal inferences about the direction of the relationship between informal caregiving and sustainable behaviors. It is possible that more environmentally conscious individuals are also more likely to take on caregiving roles. Additionally, the self-reported measures of both caregiving and sustainable behaviors may be subject to social-desirability bias, although the large sample size and the inclusion of covariates help to mitigate this concern. Future research may employ longitudinal designs and objective behavioral measures to provide stronger evidence of causality and reduce potential biases.

Despite these limitations, we believe this study makes a significant and novel contribution to the literature. It is the first to demonstrate a robust and consistent association between informal caregiving and a wide range of environmentally sustainable behaviors across a large and diverse sample of European countries. It extends our understanding of the factors that promote eco-friendly actions and highlights the role of caregivers as potential environmental stewards. It also opens up new lines of inquiry into the mechanisms linking interpersonal and environmental care, and the potential for interventions that synergistically promote both.

Although this study provides valuable insights into the association between caregiving and sustainable behaviors, future research could benefit from a mixed-methods approach. Combining quantitative data with qualitative interviews of caregivers across different EU countries could offer deeper insights into the motivations behind eco-friendly behaviors among various caregiver groups. Such a study design could help address the important question of causality and directionality in the relationship between informal caregiving and sustainable behavior. Qualitative data could illuminate the thought processes, values, and life experiences that shape caregivers' environmental attitudes and practices. Additionally, longitudinal studies tracking individuals before, during, and after caregiving periods could further elucidate the temporal dynamics of this relationship. These approaches would complement the broad patterns identified in this study with rich, contextual understanding of how and why caregiving experiences might influence environmental behaviors.

In conclusion, this study breaks new ground by illuminating the intersection of two critical domains of prosocial behavior: caring for vulnerable individuals and caring for the planet. It demonstrates that informal caregivers are unsung heroes not only of social support but also of environmental sustainability. As the world confronts the dual challenges of population aging and ecological crisis, understanding and supporting the role of caregivers as agents of change will be increasingly vital. Our findings provide a strong foundation for future research and policy initiatives aimed at promoting a more caring and sustainable society.

Supplementary Material

Supplementary data are available at *Innovation in Aging* online.

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Conflict of Interest

None.

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Informed Consent Statement

Informed consent was obtained from all subjects involved in the study. This was necessary as the survey included questions on political activities and health. All respondents received a separate question in which they were explicitly informed about the content of the survey, its aim, and the data storage. Only after consenting to it were they allowed to participate in the survey.

Institutional Review Board/Ethical Statement

The study was conducted in accordance with the Declaration of Helsinki, and the survey protocol was approved by the global Data Privacy & Research Compliance Team of Ipsos. Some modifications of the questionnaire were needed before their approval, such as including special data consent, adding refusal options, and including answers referring not to the individual respondent but to personal details about another adult person (in this case, the partner) in brackets/groups.

Data Protection Procedures

The survey was carried out in strict compliance with national and EU data-protection legislation, especially General Data Protection Regulation (GDPR) (Regulation (EU) 2016/679), Regulation (EU) 2018/1725, as well as regulation EC No. 223/2009 on the processing of data for statistical purposes. An integrated EU-27 data set was created on the basis of the anonymized national data sets. The anonymization procedure prevented respondents from being identified. A separate informed-consent clause was included in the introductory text of the survey. These apprised respondents of their rights to data access, rectification, withdrawal, and restriction, the right to object to data processing, and the right to lodge a complaint with the data protection supervisory authority.

References

Abushammala, H., & Ghulam, S. T. (2023). Impact of residents' demographics on their knowledge, attitudes, and practices towards waste management at the household level in the United Arab Emirates. *Sustainability*, 15(1), 685. https://doi.org/10.3390/su15010685

Aral, O. H., & Lopez-Sintas, J. (2020). A comprehensive model to explain Europeans' environmental behaviors. *Sustainability*, 12(10), 4307. https://doi.org/10.3390/su12104307

Arroyo, P., & Carrete, L. (2019). Motivational drivers for the adoption of green energy: The case of purchasing photovoltaic systems. *Management Research Review*, 42(5), 542–567. https://doi.org/10.1108/mrr-02-2018-0070

Austin, P. C., Goel, V., & van Walraven, C. (2001). An introduction to multilevel regression models. *Canadian Journal of Public Health*, 92(2), 150–154. https://doi.org/10.1007/BF03404950

Bauer, J. M., & Sousa-Poza, A. (2015). Impacts of informal caregiving on caregiver employment, health, and family. *Journal of population Ageing*, 8, 113–145. https://doi.org/10.1007/s12062-015-9116-0

Bimbo, F., Russo, C., Di Fonzo, A., & Nardone, G. (2021). Consumers' environmental responsibility and their purchase of local food: Evidence from a large-scale survey. *British Food Journal*, 123(5), 1853–1874. https://doi.org/10.1108/bfj-05-2020-0398

Brandenstein, N., Ackermann, K., Aeschbach, N., & Rummel, J. (2023). The key determinants of individual greenhouse gas emissions in Germany are mostly domain-specific. *Communications Earth & Environment*, 4(1), 422. https://doi.org/10.15446/rce

Brînduşa, P. (2019). *To be or not to be sustainable: The care ethics of the environment vs. the tragedy of the commons*. https://www.filodiritto.com/be-or-not-be-sustainable-care-ethics-environment-vs-tragedy-commons. Accessed January 10, 2025.

Carvajal, N. M., & Zaman, R. (2022). Biodiversity disclosure, sustainable development and environmental initiatives: Does board gender diversity matter? *Business Strategy and the Environment*, 31(3), 969–987. https://doi.org/10.1002/bse.2929

Chatterton, P., & Pickerill, J. (2010). Everyday activism and transitions towards post-capitalist worlds. *Geographical Journal*, 35(4), 475–490. https://doi.org/10.1111/j.1475-5661.2010.00396.x

Cousins, E. M. (2021). Mobilizing motherhood: The gendered burden of environmental protection. *Sociology Compass*, 15(5), 2–14. https://doi.org/10.1111/soc4.12879

Desrochers, J. E., & Zelenski, J. M. (2023). Why are males not doing these environmental behaviors? Exploring males' psychological barriers to environmental action: Research and reviews. *Current Psychology: Research and Reviews*, 42(29), 25042–25060. https://doi.org/10.1007/s12144-022-03587-w

Dombroski, K. (2016). Hybrid activist collectives: Reframing mothers' environmental and caring labor. *International Journal of Sociology and Social Policy*, 36(9/10), 629–646. https://doi.org/10.1108/ijssp-12-2015-0150

EIGE (2022). *Gender Equality Index 2022 The COVID-19 pandemic and care. Luxembourg: Publications Office of the European Union*. https://eige.europa.eu/publications-resources/publications/gender-equality-index-2022-covid-19-pandemic-and-care

EIGE (2023). *Online panel survey of gender gaps in unpaid care, individual and social activities – Technical report, Publications office of the European Union*, Luxembourg. https://eige.europa.eu/publications-resources/publications/online-panel-survey-gender-gaps-unpaid-care-individual-and-social-activities-technical-report

European Commission (2020a). *Communication from The Commission to The European Parliament, The Council, The European Economic and Social Committee and The Committee of the Regions. A Union of Equality: Gender Equality Strategy 2020-2025. Brussels, 5.3.2020 COM(2020) 152 final*. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0152

European Commission (2020b). *Standardised key social variables Implementing guidelines*. Standardised-key-social-variables.pdf (europa.eu)

European Commission (2022c). *Communication from The Commission to The European Parliament, The Council, The European Economic and Social Committee and The Committee of the Regions on the European care strategy. Brussels, 7.9.2022 COM(2022) 440 final*. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022DC0440

European Commission (2024). *Policy mixes more likely to succeed in fostering sustainable, climate-friendly behavior*. https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/policy-mixes-more-likely-succeed-fostering-sustainable-climate-friendly-behaviour-2024-01-18_en Accessed January 10, 2025.

García-Salirrosas, E. E., Niño-de-Guzmán, J. C., Gómez-Bayona, L., & Escobar-Farfán, M. (2023). Environmentally responsible purchase intention in pacific alliance countries: Geographic and gender evidence in the context of the COVID-19 Pandemic. *Behavioral Sciences*, 13(3), 221. https://doi.org/10.3390/bs13030221

Geng, J., Yang, N., Zhang, W., & Yang, L. (2023). Public willingness to pay for green lifestyle in China: A contingent valuation method based on integrated model. *International Journal of Environmental Research and Public Health*, 20(3), 2185. https://doi.org/10.3390/ijerph20032185

Gilligan, C. (1993). *In a different voice: Psychological theory and women's development*. Harvard University Press.

Gkargkavouzi, A., Paraskevopoulos, S., & Matsiori, S. (2018). Who cares about the Environment? *Journal of Human Behavior in the Social Environment*, 28(6), 746–757. https://doi.org/10.1080/10911359.2018.1458679

Godin, L., & Langlois, J. (2021). Care, gender, and change in the study of sustainable consumption: A critical review of the literature. *Frontiers in Sustainability*, 2, 725753. https://doi.org/10.3389/frsus.2021.725753

Greenfield, J. C., Hasche, L., Bell, L. M., & Johnson, H. (2018). Exploring how workplace and social policies relate to caregivers' financial strain. *Journal of Gerontological Social Work*, 61(8), 849–866. https://doi.org/10.1080/01634372.2018.1487895

Halkos, G., & Matsiori, S. (2017). Environmental attitude, motivations and values for marine biodiversity protection. *Journal of Behavioral and Experimental Economics*, 69, 61–70. https://doi.org/10.1016/j.socec.2017.05.009

Hallum-Montes, R. (2012). "Para El Bien Comun" indigenous women's environmental activism and community care work in Guatemala. *Race, Gender, and Class*, 19(1/2), 104–130. https://doi.org/10.1007/s13593-015-0325-y

Hox, J. (1998). Multilevel modeling: When and why. In: Balderjahn I, Mathar R, Schader M, eds. *Classification, Data Analysis, and Data Highways. Studies in Classification, Data Analysis, and Knowledge Organization*. Berlin, Heidelberg: Springer. https://doi.org/10.1007/978-3-642-72087-1_17

Katz, E., & Lazarsfeld, P. F. (1955). *Personal Influence: The Part Played by People in the Flow of Mass Communications*. Free Press.

Kusturica, M. P., Ostojic, T., Kresoja, M., Horvat, O., Tomas, A., et al. (2021). Household pharmaceutical waste (example from Serbia). *European Journal of Public Health*, 31(Supplement_3):ckab165.333.

Leelakulthanit, O. (2014). The factors affecting the adoption of LED lamps. *International Business & Economics Research Journal*, 13(4), 757. https://doi.org/10.19030/iber.v13i4.8684

Li, Y., Wang, B., & Saechang, O. (2022). Is female a more pro-environmental gender? Evidence from China. *International Journal of Environmental Research and Public Health*, 19(13), 8002. https://doi.org/10.3390/ijerph19138002

Long, N., Lu, C., & Fan, L. (2023). Social class and private-sphere green behavior in China: The mediating effects of perceived status and environmental concern. *International Journal of Environmental Research and Public Health*, 20(5), 4329. https://doi.org/10.3390/ijerph20054329

Maio, G. (2018). Fundamentals of an ethics of care. In: Krause F, Boldt J, eds. *Care in healthcare: Reflections on theory and practice*, 51–63. Palgrave Macmillan. https://www.ncbi.nlm.nih.gov/books/NBK543745/

Martins, A., Madaleno, M., & Ferreira Dias, M. (2021). Women vs men: Who performs better on energy literacy? *International Journal of Sustainable Energy Planning and Management*, 32, 37–46. https://doi.org/10.5278/ijsepm.6516

Migheli, M. (2021). Green purchasing: The effect of parenthood and gender. *Environment, Development and Sustainability*, 23, 10576–10600. https://doi.org/10.1007/s10668-020-01073-6

Milfont, T. L., Poortinga, W., & Sibley, C. G. (2020). Does having children increase environmental concern? Testing parenthood effects with longitudinal data from the New Zealand Attitudes and Values Study. *PLoS One*, 15(3), e0230361. https://doi.org/10.1371/journal.pone.0230361

Moser, S., & Kleinhückelkotten, S. (2018). Good intents, but low impacts: Diverging importance of motivational and socioeconomic determinants explaining pro-environmental behavior, energy use, and carbon footprint. *Environment and Behavior*, 50(6), 626–656. https://doi.org/10.1177/0013916517710685

Musova, Z., Musa, H., & Matiova, V. (2021). Environmentally responsible behavior of consumers: Evidence from Slovakia. *Economics & Sociology*, 14(1), 178–198. https://doi.org/10.14254/2071-789X.2021/14-1/12

O'Connor, E., Hynes, S., Chen, W., Papadopoulou, N., & Smith, C. (2021). Investigating societal attitudes toward marine ecosystem restoration. *Restoration Ecology*, 29(s2), e13239. https://doi.org/10.1111/rec.13239

Onel, N., & Mukherjee, A. (2014). Analysis of the predictors of five eco-sensitive behaviors. *World Journal of Science, Technology and Sustainable Development*, 11(1), 16–27. https://doi.org/10.1108/wjstsd-08-2013-0031

Puciato, D., Szromek, A., & Bugdol, M. (2023). Willingness to pay for sustainable hotel services as an aspect of pro-environmental behavior of hotel guests. *Economics & Sociology*, 16(1), 106–122. https://doi.org/10.1016/j.ijhm.2022.103167

Revenson, T., Griva, K., Luszczynska, A., Morrison, V., Panagopoulou, E., Vilchinsky, N., & Hagedoorn, M. (2016). *Caregiving in the illness context*. Springer.

Rosner, Y., Amitay, Z., & Perlman, A. (2022). Consumer's attitude, socio-demographic variables and willingness to purchase green

housing in Israel. *Environment, Development and Sustainability*, 24(4), 5295–5316. https://doi.org/10.1007/s10668-021-01659-8

Sánchez, M., López-Mosquera, N., & Lera-López, F. (2016). Improving pro-environmental behaviors in Spain. The role of attitudes and socio-demographic and political factors. *Journal of Environmental Policy & Planning*, 18(1), 47–66. https://doi.org/10.1080/1523908X.2015.1046983

Schulz, R., & Eden, J. (Eds.). (2016). *Families caring for an aging America*. National Academies Press.

Senturk, G., & Dumludag, D. (2022). The relationship between consumption of single-use plastic bags, environmental awareness, and socio-demographic factors. *Journal of Material Cycles and Waste Management*, 24(4), 1494–1507. https://doi.org/10.1007/s10163-022-01407-8

Shi, J., Lu, C., & Wei, Z. (2022). Effects of social capital on pro-environmental behaviors in Chinese residents. *Sustainability*, 14(21), 13855. https://doi.org/10.3390/su142113855

Stern, P. C. (2000). New environmental theories: Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, 56(3), 407–424. https://doi.org/10.1111/0022-4537.00175

Streimikien, D., & Balezentis, A. (2015). Assessment of willingness to pay for renewables in Lithuanian households. *Clean Technologies and Environmental Policy*, 17(2), 515–531. https://doi.org/10.3390/su14148370

Swim, J. K., Gillis, A. J., & Hamaty, K. J. (2020). Gender bending and gender conformity: The social consequences of engaging in feminine and masculine pro-environmental behaviors. *Sex Roles*, 82(5–6), 363–385. https://doi.org/10.1007/s11199-019-01061-9

Tahal, R., & Formanek, T. (2022). Environmental stances and lifestyle preferences in Czechia: Generational aspects and socio-demographic implications. *Central European Business Review*, 11(5), 1–21. https://doi.org/10.18267/j.cebr.305

Tan, T. M., Makkonen, H., Kaur, P., & Salo, J. (2022). How do ethical consumers utilize sharing economy platforms as part of their sustainable resale behavior? The role of consumers' green consumption values. *Technological Forecasting and Social Change*, 176(1), 121432. https://doi.org/10.1016/j.techfore.2021.121432

Trelohan, M. (2022). Do women engage in pro-environmental behaviours in the public sphere due to social expectations? The effects of social norm-based persuasive messages. *International Journal of Voluntary and Nonprofit Organizations*, 33(4), 134–148. https://doi.org/10.1007/s11266-020-00303-9

Tronto, J. (2020). *Moral boundaries: A political argument for an ethic of care*. Routledge.

Uddin, S. M. F., & Khan, M. N. (2016). Exploring green purchasing behavior of young urban consumers: Empirical evidences from India. *South Asian Journal of Global Business Research*, 5(1), 85–103. https://doi.org/10.1108/sajgbr-12-2014-0083

Vasco, C., Salazar, D., Cepeda, D., Sevillano, G., Pazmiño, J., & Huerta, S. (2022). The socioeconomic drivers of ethical food consumption in Ecuador: A quantitative analysis. *Sustainability*, 14(20), 13644. https://doi.org/10.3390/su142013644

Whitley, S. G., Nelsen, B. F., & Guth, J. L. (2023). Explaining Green Party support in the 2019 European Parliamentary Elections: A test of four hypotheses. *Society*, 60(3), 413–425. https://doi.org/10.1007/s12115-023-00824-1

Wojewódzka-Wiewiórska, A., & Barska, A. (2021). Exploring the preferences of consumers' organic products in aspects of sustainable consumption: The case of the Polish Consumer. *Agriculture*, 11(2), 138. https://doi.org/10.3390/agriculture11020138

Wojewódzka-Wiewiórska, A., Vaznonienė, G., & Vaznonis, B. (2022). Who cares for nature in rural areas? Exploration of relationships between people's socio-economic characteristics and the perception of nature as a value in Poland and Lithuania. *Sustainability*, 14(16), 10048. https://doi.org/10.3390/su141610048

Xiao, C., & Hong, D. (2010). Gender differences in environmental behaviors in China. *Population and Environment*, 32(1), 88–104. https://doi.org/10.1007/s11111-010-0115-z

Yang, K., & Banamah, A. (2014). Quota sampling as an alternative to probability sampling? An experimental study. *Sociological Research Online*, 19(1), 56–66. https://doi.org/10.5153/sro.3199

Yates, A., Luo, Y., Mobley, C., & Shealy, E. (2015). Changes in public and private environmentally responsible behaviors by gender: Findings from the 1994 and 2010 General Social Survey. *Sociological Inquiry*, 85(4), 503–531. https://doi.org/10.1111/soin.12089

Yeonsoo, S., & Giyeon, K. (2023). Age differences in climate change attitudes and behaviors. *Innovation in Aging*, 7(1), 830. https://doi.org/10.1093/geroni/igad104.2676