Cross-National Gender Variation in Environmental Behaviors*

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Objective. This article presents a cross-national examination of gender variations in environmental behaviors. Research on environmental concern reveals modest distinctions between men and women, with women typically displaying higher levels of environmental concern and behavioral adjustments relative to men. Additionally, some prior research suggests that women appear more engaged in household-oriented (private) pro-environment behaviors (e.g., recycling), and men in community/society-oriented (public) pro-environment behaviors (e.g., protests). The analysis provided here offers an important extension to existing research through its cross-cultural, comparative perspective. *Method.* We make use of the 1993 International Social Survey to explore gender differences in ''private'' and ''public'' environmentally-oriented behaviors across 22 nations. *Results.* It is shown that women tend to engage in more environmental behaviors than men in many nations, particularly private behaviors. In addition, both women and men tend to engage in relatively more private environmental behaviors as opposed to public ones. *Conclusion.* The cross-national analysis provides support for gender distinctions with regard to some environmental behaviors within most of the incorporated 22 national contexts. Gender differences in level of private environmental behaviors tend to be more consistent within nations at the upper end of the wealth distribution.

Research on gender differences in environmental concern reveals modest distinctions between men and women, with women typically tending to display higher levels of environmental concern and behavioral adjustments relative to men (e.g., Zelezny, Chua, and Aldrich, 2000). Additionally, some research suggests that there are gender differences in ''public'' relative to ''private'' environmentally-oriented behaviors, with women more actively engaged in household-oriented (private) pro-environment behaviors (e.g., recycling), and men more actively engaged in community/society-oriented

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(public) pro-environment behaviors (e.g., protests) (Blocker and Eckberg, 1997; Davidson and Freudenburg, 1996; McStay and Dunlap, 1983). Notably, however, other work finds no gender distinctions in environmental activism (e.g., Tindall, Davies, and Mauboulé, 2003). The analysis provided here offers an important extension to existing research on gender dimensions of environmental concern and behaviors through its cross-cultural, comparative perspective. Although some cross-national research has been undertaken with regard to public concern for environmental quality, particularly as related to national affluence (e.g., Diekmann and Franzen, 1999; Dunlap and Mertig, 1995; Franzen, 2003), to our knowledge no such inquiries have focused on cross-cultural gender variations across a wide variety of national contexts and, hence, the contribution of this work. Specifically, we make use of the 1993 International Social Survey to explore gender differences in private and public environmentally-oriented behaviors across 22 nations. We first provide a review of the literature forming a foundation for the analyses, specifically as related to gender variation in environmental concern and behaviors. We then present the results, followed by discussion of insights gained.

Gender Variation in Environmental Concern and Behaviors

Over the past three decades, social scientists have struggled to conceptualize and measure public environmental concern, although there are obvious difficulties inherent in gauging a concept so fundamentally complex. Although still somewhat controversial, measurements of "environmental concern" have been formalized to the point where such concern has, indeed, been systematically investigated. As an example of such a definition, Dunlap and Jones (2002:484) state, "environmental concern refers to the degree to which people are aware of problems regarding the environment and support efforts to solve them and/or indicate a willingness to contribute personally to their solution." Typically within social science research, objects of environmental concern are presented as specific issues (e.g., CO_2 emissions, nuclear power) or sets of interrelated, often more vague, phenomenon (e.g., the natural environment, global warming, economic development, biodiversity loss).

Several studies have specifically focused on gender variation in environmental concern, with the results providing modest evidence that women typically express more concern with environmental issues relative to men (Blocker and Eckberg, 1989, 1997; Bord and O'Connor, 1997; Davidson and Freudenburg, 1996; McStay and Dunlap, 1983; Mohai, 1992, 1997). As for environmental behaviors, in a review of research published between 1988–1998, Zelezny, Chua, and Aldrich (2000) find that the majority of studies suggest that, compared to men, women report greater participation in pro-environmental behavior and activism. However, a focus on specific types of behavior tells a more nuanced story; some work suggests that

women are *not* more likely to engage in pro-environment "public" behaviors tending toward activism (e.g., volunteer time, attend public meetings) relative to men (Blocker and Eckberg, 1997; Davidson and Freudenburg, 1996; McStay and Dunlap, 1983; Mohai, 1992; Tindall, Davies, and Mauboules, 2003), although women appear more likely to engage in "private" behaviors within the household reflecting concern with environmental issues (e.g., recycling, buying/eating organic) (Blocker and Eckberg, 1997; Davidson and Freudenburg, 1996; McStay and Dunlap, 1983; Tindall, Davies, and Mauboules, 2003).

Findings of this nature are often characterized as reflecting traditional gender socialization, with researchers positing that individual behaviors are shaped by gender expectations within the context of cultural norms (Zelezny, Chua, and Aldrich, 2000). Within this framework, females take on roles as caregivers and nurturers (Blocker and Eckberg, 1989; McStay and Dunlap, 1983; Mohai, 1992, 1997) and are encouraged to be cooperative and display compassion (e.g., Beutel and Marini, 1995; Chodorow, 1974; Gilligan, 1982). It is argued that, within traditional gender socialization, women's position as childbearers and caretakers leads them to embrace a worldview based on concern for the maintenance of life and relationships (McStay and Dunlap, 1983). Females have also been shown to value altrusim (e.g., Dietz, Kalof, and Stern, 2002), which is further associated with environmental behaviors. The strength of these socialization processes continues to be evidenced when women enter the paid workforce, as women often continue to engage in nurturing "private-sphere" roles upon return home at day's end (Hochschild, 1989). This "motherhood mentality" is argued, by some, to extend to protective attitudes toward nature, as females come to understand themselves as embedded within community and within the larger world (Blocker and Eckberg, 1997; Davidson and Freudenburg, 1996).[1]

Traditional male socialization, on the other hand, encourages men to emphasize providing economically for the family (Blocker and Eckberg, 1989; McStay and Dunlap, 1983; Mohai, 1992, 1997). It is argued that this "bread-winner" role also encourages men to be more controlling and separatist in their quest to be economically successful (Chodorow, 1974; Gilligan, 1982).

These patterns of gender socialization may be expected to influence dimensions of environmental behavior, as men are socialized to be more

[1]Ecofeminist perspectives also offer interesting insight into gender dimensions of environmentalism. Some ecofeminists make essentialist claims that women are "closer" to nature than men, have a unique capacity to nurture the earth, and are, therefore, uniquely suited to engage in environmental matters (e.g., Johnson and Johnson, 1994; King, 1995). Specifically, due to women's capacity for, and experience with, menstruation, pregnancy, childbirth, and motherhood, some ecofeminists argue that women's special connection to nature gives them particular authority in environmental activism (Stearney, 1994).

involved in the "'public sphere" of society and marketplace than the "private sphere" of home and family (Tindall, Davies, and Mauboules, 2003). The "marketplace mentality" resulting from male socialization may be linked to objectification and desire to dominate the environment (Davidson and Freudenburg, 1996; McStay and Dunlap, 1983). On the other hand, women's "traditional" domain of the home may suggest greater likelihood to engage in private-sphere environmentally-oriented behaviors (Mohai, 1992). Also related to the public-private spheres, previous research suggests that people will comply with their pro-environmental attitudes and engage in pro-environmental behaviors in situations that do *not* involve "substantial" costs, such as time, discomfort, money (Diekmann and Preisendörfer, 1998). In considering gendered domains as outlined above, this "low-cost hypothesis" might suggest that women's behavioral costs are lower in the private sphere, with men experiencing lower behavioral costs in the public sphere, based on their relative familiarity with the different arenas of behavioral experience.

Indeed, a similar association has been posited by Tindall, Davies, and Mauboules (2003) in recent work on gender variation in domestically-focused environmental behaviors relative to environmental activism. They argue that women's lack of "biographical availability" due to their "doubleday" (work and home obligations as a result of gendered division of labor) mutes women's activism. In a study of gender variation in environmentally-friendly behaviors and activism in three environmental organizations in British Columbia, Tindall, Davies, and Mauboules (2003) find evidence of greater commitment to environmentalism among women relative to men. This commitment is further evidenced by women's higher relative levels of involvement in environmentally-friendly behaviors that can be undertaken in the course of regular daily routines (e.g., recycling, buying organic produce, conserving energy, reusing objects). Still, and as related to the present study, Tindall, Davies, and Mauboules did *not* find women to be more engaged in local environmental activism. Importantly, the researchers specifically suggest that "while gendered divisions in the worlds of paid and domestic labor clearly have consequences for both activism and environmentally friendly behaviors, these divisions of labor vary across space and time" (2003:927). As such, they call for comparative research, a call we take on here.

As for cross-national variation in gender socialization, studies have found that most societies engage in a form of differential socialization in which boys and girls are treated differently and encouraged to pursue gendered activities (Block, 1973; Lewis and Weinraub, 1979; Williams and Best, 1990). As discussed above, the practice of traditional gender socialization typically encourages women to be caregivers and nurturers, whereas men are socialized to be more involved in the public sphere. Research suggests that these general gender roles are found to exist cross-culturally (Block, 1973; Williams and Best, 1990; Zelezny, Chua, and Aldrich, 2000). When linked

to environmental concern, Zelezny, Chua, and Aldrich (2000) argue that these processes of gender socialization lead women to display more environmental concern than men cross-culturally.

Interestingly, little academic work has explored cross-cultural gender variations in environmental concern and/or behavior. An exception is Zelezny, Chua, and Aldrich (2000), whose cross-national work with university students revealed fairly consistent results suggesting greater environmental concern and behaviors among females as compared to males. Further, Zelezny, Chua, and Aldrich (2000) find support for gender socialization as an explanation for gender differences in environmentalism. A key limitation to their research, however, is the lack of generalizability resultant of a non-representative sample.

Examinations of the gender dimensions of environmental concern, particularly cross-nationally, have both academic and applied interest in that the findings contribute to: (1) gender dimensions of environmental concern generally; (2) potential understandings of cross-cultural variation in traditional gender socialization; and (3) a better understanding of who *is*, and is *not*, engaging in environmentally-oriented behaviors within particular national contexts.

Research Objective and Hypotheses

Based on the above literature, we put forth the following four hypotheses that deal with both within, and across, gender contrasts with regard to public and private environmentally-oriented behaviors. Across genders, we hypothesize that women will engage in more private environmentally-oriented behaviors than will men (e.g., Blocker and Eckberg, 1997; Tindall, Davies, and Mauboules, 2003), while we expect no gender variation in more public environmentally-oriented behaviors (e.g., Tindall, Davies, and Mauboules, 2003). Within-gender contrasts are expected to reveal that women favor private behaviors relative to public ones. Men, on the other hand, are expected to engage in more public, relative to private, environmentally-oriented behaviors (based on biographical availability and the low-cost hypothesis). Specifically, we hypothesize:

Across-Gender Contrasts

H1: *Women engage in more* private-*sphere environmentally-oriented behaviors relative to men.*

H2: *There is no gender variation in* public-*sphere environmentally-oriented behaviors.*

Within-Gender Contrasts

H3: *Women engage in more* private-*sphere environmentally-oriented behaviors as compared with* public-*sphere behaviors.*

H4: *Men engage in more* public-*sphere environmentally-oriented behaviors as compared with* private-*sphere behaviors.*

Data and Methods

The International Social Survey Program (ISSP ⟨http://www.issp.org⟩) is an annual, cross-national collaboration within which several countries each undertake a sample survey on rotating substantive topics. The national samples are either nationally representative of the adult population or analytical weights are supplied to compensate for nonrandom sample selection.[2] The merging of the data into a cross-national data set is performed by the Zentralarchiv für Empirische Sozialforschung, University of Cologne in collaboration with the Analisis Sociologicos, Economicos y Politicos in Spain. Herein, we make use of the 1993 Environment Survey, with data from 20 nations, which represents 22 social groups due to the ISSP's distinction of Northern Ireland and Great Britain, as well as East and West Germany. Despite the fact that the ISSP survey lacks some of the more common measures of environmental concern (e.g., the "New Ecological Paradigm" scale), the comprehensive nature of the survey's sociodemographic data, its large sample size, and the range of nations from which the ISSP data were collected make it a uniquely appropriate data set for exploration of cross-national gender variation in environmental behaviors.

Six questions are used to gauge public- and private-sphere environmentally-oriented behaviors (see Table 1), three representing each category. The three questions measuring public-sphere activities reflect organizational membership, support, and political activity. Here, individuals are classified as engaging in the particular behavior if they responded, "yes, I do" belong to an environmental organization, "yes, I have" signed a petition about an environmental issue within the past five years, and/or "yes, I have" taken part in a protest or demonstration about an environmental issue within the past five years. The three questions measuring private-sphere activities indicate more personal decisions regarding recycling, purchasing, and transportation (see Table 1 for descriptive statistics). We characterize a

[2]The specific sampling strategies and calculation of analytical weights vary by country, although guidelines are provided by the broader organization. In general, each participating nation agrees to undertake an annual survey with a nationally representative random sample of the adult population designed to achieve a norm of 1,400 cases and a minimum of 1,000 cases. Analytical weights are provided by each country, as deemed necessary, with a clear description of the weighting procedure supplied to ISSP. As an example of weighting schemes, for Canadian respondents, weights are provided due to sample stratification by province. For Canada, the data are weighted for age, sex, and province using 1991 Statistics Canada census parameters. Canada's weighting scheme is typical in that for most countries providing analytical weights, such are based on age, sex, education, and/or geography.

TABLE 1

Private and Public Environmentally-Oriented Behaviors, ISSP, 1993

	Total Sample	Min	Country	Max	Country
Private-Sphere Behaviors			*% At Least "Sometimes"*		
How often do you make a special effort to. . .					
sort glass, or tin, or plastic, or newspapers and so on for recycling?	82.5%	0.4%	Russia	97.9%	W. Germany
buy fruits and vegetables grown without pesticides or chemicals?	66.6%	18.1%	Israel	86.5%	W. Germany
cut back on driving for environmental reasons?	42.5%	10.8%	Israel	80.6%	W. Germany
Public-Sphere Behaviors			*Percentage "Yes"*		
In the past five years, have you . . .					
been a member of any group whose main aim is to preserve or protect the environment?	6.7%	1.7%	Bulgaria	17.4%	New Zealand
signed a petition about an environmental issue?	22.3%	5.0%	Hungary	55.1%	New Zealand
taken part in a protest or demonstration about an environmental issue?	4.8%	1.5%	Hungary	8.5%	W. Germany

SOURCE: ISSP 1993. All data are weighted for analysis.

respondent as engaging in a particular behavior if he or she responds that the respondent does so "always," "often," or "sometimes." The other response category is "never," and as such, we collapse these into dummy variables representing any engagement or no engagement in the particular environmental behavior. Especially relevant in the case of private behaviors, the ISSP also makes note of a respondent's lack of opportunity to engage in a particular behavior (recycling is unavailable, organic produce is unavailable, or has no car/doesn't drive). These indicators are particularly important in calculating the outcome measures, as described below.[3]

[3]Such missing data would pose a virtually insurmountable barrier if our analytical interest were in making contrasts across nations in *level* of participation, since bias in lack of opportunity for environmentally-oriented behaviors would compromise both the reliability and validity of cross-national contrasts. However, since our interests are in contrasting across genders *within* nations, lack of comparability across nations becomes less important since, logically, less frequent opportunity within a national context should affect both men and women.

Making use of the data reflecting private and public behavioral indicators, we create two outcome variables. First, a simple percentage is calculated for both private and public, representing the percentage of behaviors *available to a respondent* in which he or she engages. Therefore, a respondent who buys organic produce, but does not recycle due to the lack of opportunity and does not own a car, is said to engage in 100 percent of the private behaviors available to him or her even though only one of the three possible behaviors is actually undertaken. Second, to reflect the relative level of involvement in each type of behavior, we subtract the percentage of public behaviors from the percentage of private behaviors, thereby creating a percentage point difference to reflect the relative engagement in these private-public activities within genders. A positive difference measure, therefore, reflects a relatively higher percentage of engagement in private than public behaviors. As a hypothetical example, a respondent engaging in 100 percent of the private behaviors available to her, but in only 33 percent of the public behaviors available to her, would have a value of 66 percent for the private-public difference measure. Additional background information on the variables included in the analyses is provided in Table 1.

As for analytical strategy, for Hypotheses 1 and 2, we use OLS regression to predict percentage public and private behaviors as a function of gender, as well as age, education, employment status, and marital status. Past research suggests that environmental concern is often negatively associated with age and positively related to educational level (Fortmann and Kusel, 1990; Kanagy, Humphrey, and Firebaugh, 1994; Rasinski, Smith, and Zuckerbraun, 1994). However, while younger individuals tend to express the greatest environmental concern, middle-aged groups are the most politically active (Mohai and Twight, 1987). Employment status and marital status are included as control variables primarily due to their links to the gender roles central to the theoretical foundation of these analyses, as well as due to the precedents for the inclusion of these demographic variables in studies of environmental concern (Ebreo and Vining, 2001; Coppin, Eisenhauer, and Krannich, 2002; Tindall, Davies, and Mauboules, 2003). Controlling for the effects of these additional sociodemographic characteristics allows for a more specific estimation of gender differences. For Hypotheses 3 and 4, we use OLS regression to predict the percentage point *difference* in the level of engagement in private versus public environmentally-oriented behaviors. For all hypotheses, we estimate country-specific models in order to allow the gender coefficient to vary across nations.[4]

[4]In the case of all multivariate models, as opposed to nation-specific models, another strategy would be to incorporate interactions reflecting gender and the various national contexts within one comprehensive model. However, such an approach would not allow for consideration of cross-national variation in the control variables and, as such, we believe our strategy allows more accurate isolation of the gender effect for each nation. Results from the interaction models are available from the lead author.

Results

Country-specific bivariate results are presented in Table 2; Table 3 reflects multivariate estimates (only gender coefficients displayed).[5] Presented in Table 2 are the average percentages of participation in public and private environmentally-oriented behaviors, by gender, with significance tests for across, and within, genders in the right-hand columns. Across-gender tests reflect the statistical significance of the difference across men and women for either public or private behaviors; that is, the tests reflect whether or not men and women engage in different levels of public, as well as different levels of private, environmental behaviors. Within-gender tests reflect the statistical significance of the difference for men and women separately of the relative frequency of public versus private behaviors; that is, the tests reflect whether or not women engage in different levels of public versus private behaviors, as well as whether or not men differentially engage in these two categories of activities.

In Table 3, the first two columns represent the estimates for gender within models predicting the percentage of available public or private environmentally-oriented behaviors engaged in by respondents. As such, these coefficients reflect across-gender effects. The third column represents the estimate for within-gender models, estimating the difference between the number of private and public behaviors, thereby yielding a within-gender test.

Within the tables, nations are presented in descending order by gross national income per capita, 1991–2001, formerly referred to as GNP (World Bank, 2003), given previous analytical focus on level of economic development and environmental attitudes (e.g., Brechin and Kempton, 1994; Franzen, 2003; Ingelhart, 1995).[6] We make use of the four research hypotheses to organize the following presentation of results.

Across-Gender Contrasts

Hypothesis 1: Women Engage in More Private-*Sphere Environmentally Oriented Behaviors Relative to Men.* The results provide substantial support for this expectation, although across-gender differences do not exist for all incorporated nations. Still, some intriguing patterns do emerge. In the bivariate context, statistically significant estimates suggest that women engage

[5]Complete results are available from the lead author.

[6]In calculating gross national income and GNI per capita in U.S. dollars, the World Bank uses the Atlas conversion factor to reduce the impact of exchange-rate fluctuations in the cross-country comparison of national incomes. The Atlas conversion factor for any year is the average of a country's exchange rate (or alternative conversion factor) for that year and its exchange rates for the two preceding years, adjusted for the difference between the rate of inflation in the country, and through 2000, that in the G-5 countries (France, Germany, Japan, the United Kingdom, and the United States) (World Bank, 2003). See ⟨http://www.worldbank.org/data/aboutdata/working-meth.html#definitions⟩ for additional detail.

TABLE 2

Percentage of Public and Private Environmentally-Oriented Behaviors Engaged in by Gender[1]

	Private		Public		Sig. Across Gender		Sig. Within Gender	
	F	M	F	M	Private	Public	F	M
Japan	81.92	67.37	10.17	9.43	***		***	***
Norway	67.44	57.71	9.78	8.70	***		***	***
U.S.A.	65.62	59.16	14.69	15.42	***		***	***
N. Ireland	57.07	50.83	11.76	11.62	*		***	***
Great Britain	66.63	58.91	15.11	17.45	***		***	***
Netherlands	81.77	76.87	16.05	13.45	***	*	***	***
W. Germany	87.52	89.92	14.41	14.23			***	***
E. Germany	87.45	82.88	13.79	13.90	**		***	***
Ireland	52.51	40.42	9.66	9.54	***		***	***
Canada	72.65	68.10	19.12	20.54	**		***	***
Australia	72.34	61.45	21.44	17.58	***	***	***	***
Italy	61.29	55.30	11.46	11.72	**		***	***
Israel	24.92	24.97	7.91	9.02			***	***
Spain	44.31	40.27	6.47	9.04		*	***	***
New Zealand	66.12	55.77	28.81	24.26	***	**	***	***
Slovenia	63.42	61.54	5.96	7.37			***	***
Czech Republic	70.56	64.84	7.13	8.63	*		***	***
Hungary	43.82	43.20	3.25	2.82			***	***
Poland	64.69	63.68	4.03	8.57		***	***	***
Russia	51.84	51.84	6.09	5.24			***	***
Bulgaria	45.47	36.47	4.06	6.26	***	*	***	***
Philippines	89.41	88.89	7.08	7.97			***	***
Summary					14/22 sig. 14: female more private	6/22 sig. 3: female more public 2: males more public		all sig. private more than public

[1]Nations sorted, in descending order, by gross national income per capita, 1991–2001; Germany's GNI is assigned both East and West Germany, while Great Britain's GNI is assigned to Northern Ireland; Israel's GNI per capita represents 2002 (World Bank, 2003).

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.

NOTE: All data are weighted for analysis where appropriate as indicated by the ISSP.

DATA SOURCE: ISSP 1993.

TABLE 3

Multivariate Estimation of Percentage of "Public" and "Private" Environmentally-Oriented Behaviors Engaged in by Country and Gender[1,2]
(Combined model: dummy variables incorporated for N-1 nations. National models: Estimates for effect of "gender" displayed (1 = female). Unstandardized OLS coefficients presented.)

	Across-Gender Differences		Within-Gender Differences
	Private	Public	Private-Public[3]
Combined model, gender (1 = female)	5.04***	0.33	4.61***
Japan	14.34***	1.41	13.00***
Norway	8.85***	1.11	7.67***
U.S.A.	6.61***	−0.15	6.68***
N. Ireland	6.11*	0.18	6.36*
Great Britain	6.95***	−1.81	9.09***
Netherlands	4.22***	4.24***	−0.13
W. Germany	3.47*	1.12	2.40
E. Germany	4.34**	0.92	3.19
Ireland	10.40***	0.32	9.85***
Canada	4.90**	−1.11	5.86**
Australia	10.61***	3.88**	6.84***
Italy	6.07*	1.41	4.54
Israel	−0.70	−0.92	−0.03
Spain	3.54	−0.82	4.30
New Zealand	10.43***	5.39***	4.77*
Slovenia	1.83	−0.70	2.59
Czech Republic	3.87	−0.87	4.74
Hungary	1.95	0.81	1.22
Poland	1.96	−4.23***	6.28**
Russia	−0.51	1.01	−1.94
Bulgaria	9.13***	−1.81*	10.61***
Philippines	0.93	−0.63	1.59
Summary	14/22 sig 14: female more private	5/22 sig 3: female more public 2: males more public	11/22 sig 11: female more private

[1]In all models, age, educational level, employment, and marital status are included as controls.

[2]Nations sorted, in descending order, by gross national income per capita, 1991–2001; Germany's GNI is assigned both East and West Germany, while Great Britain's GNI is assigned to North Ireland; Israel's GNI per capita represents 2002 (World Bank, 2003).

[3]Percentage of available private behaviors minus percentage of available public behaviors. Therefore, positive values reflect relatively more private behaviors.

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.

NOTE: All data are weighted for analysis where appropriate as indicated by the ISSP.

DATA SOURCE: ISSP 1993.

more frequently than men in private-sphere environmentally-oriented behaviors in 14 of the included 22 nations, with these nations tending to be at the upper end of the GNI distribution (e.g., Japan, Norway, United States). As an example, in Japan, female respondents engage in, on average, 82 percent of the private environmentally-oriented behaviors (i.e., recycling, buying organic, driving less) available to them, whereas men engage in, on average, 67 percent of such behaviors ($p < 0.00$). In no context do men engage in significantly higher levels of private-sphere behaviors as compared to women.

The multivariate findings uphold the bivariate results, providing additional evidence of a pattern whereby gender differentials appear more pronounced at higher levels of GNI. As shown in Table 3, the most substantial and significant differentials, with women engaging in relatively more private environmental behaviors, are found in Japan ($b = 14.34$), Ireland ($b = 10.40$), Australia ($b = 10.61$), and New Zealand ($b = 10.43$). At a relatively lower level of GNI, we a find statistically significant gender effect only in Bulgaria ($b = 9.13$). Again, in no case do men engage in significantly higher levels of private-sphere behaviors as compared to women.

Hypothesis 2: There is No Gender Variation in Public-*Sphere Environmentally-Oriented Behaviors*. The results provide support for this expectation, with statistically significant gender variation in only five of the incorporated 22 nations. In the bivariate context, statistically significant estimates suggest that women engage more frequently than men do in public-sphere environmentally-oriented behaviors in only three of the included 22 nations: the Netherlands, Australia, and New Zealand. As an example, in Australia, female respondents claimed to participate in, on average, 21 percent of the incorporated public environmentally-oriented behaviors (i.e., group member, sign petition, attend protest) available to them, while men participated in approximately 18 percent of such behaviors ($p < 0.000$). On the other hand, in three contexts, women participate *less* frequently in public-sphere behaviors, these nations typically being at the middle to lower end of the GNI distribution (e.g., Spain, Poland, and Bulgaria). As an example, in Poland, female respondents claimed to participate in an average of 4 percent of the incorporated public environmentally-oriented behaviors available to them, while men participated in approximately 9 percent of such behaviors ($p < 0.000$). All statistically significant associations, except Spain, are upheld in the multivariate context.

Within-Gender Contrasts

Hypothesis 3: Women Engage in More Private-*Sphere Environmentally-Oriented Behaviors as Compared with* Public-*Sphere Behaviors*. The results provide substantial support for this hypothesis, although cross-national differences do emerge. As presented in Table 2 within the columns reflecting

"significance within gender," we find that in *all* nations incorporated within the study, the bivariate percentage of public and private behaviors in which women engage differs in a statistically significant sense ($p < 0.00$). By looking at the mean values themselves, it is clear that in all cases, women undertake substantially higher levels of private environmentally-oriented behaviors than public ones.

When examined through a multivariate lens, however, the results are dampened, with gender yielding statistically significant results in 11 of the 22 incorporated national contexts. Still, all significant coefficients are positive, suggesting that women do, indeed, engage in higher levels of *private*-sphere environmentally-oriented behaviors as compared with *public*-sphere behaviors.

Hypothesis 4: Men Engage in More Public-*Sphere Environmentally-Oriented Behaviors as Compared with* Private-*Sphere Behaviors*. No support is provided for this hypothesis. As reflected in Table 2, we find that, like women, in all study nations the number of public and private behaviors undertaken by men differs in a statistically significant sense. However, against expectations, by looking at the mean values themselves, it is clear that men *also* undertake substantially higher levels of private environmentally-oriented behaviors than public ones.

When examined within a multivariate framework, the effect of being male is simply the negative of the female coefficient. To clarify, in Japan the level of participation in private versus public behaviors is 13 percentage points less for men than for women (net of incorporated control variables). In other words, the *spread* between percentage engagement in private and percentage engagement in public is 13 percentage points greater for women. Specifically, Japanese ISSP male respondents participated in 67 percent of the private behaviors available to them, but in only 9 percent of the public behaviors (difference of approximately 58 percentage points); female respondents participated in 82 percent of the private behaviors available to them, but in only 10 percent of the public behaviors (difference of approximately 72 percentage points). The significant positive coefficient for gender in Japan reflects the relatively larger difference for women while also considering values on the additional independent variables.

Although the variation in levels of engagement in private versus "public" varies by gender in some contexts, in none of the nations incorporated in the study do men participate in relatively greater levels of public than "private" environmental behaviors. As such, Hypothesis 4 is clearly rejected.

Discussion and Conclusion

Taken together, the results reveal some gender differences but, generally, these differences do not remain consistent across the 22 nations incorporated

in the analyses. Nonetheless, we derive three primary conclusions from the preceding analysis.

First, in general, the results suggest that in many of the 22 ISSP study nations, women undertake substantially more environmentally-oriented behaviors in the private sphere (e.g., recycling, driving less) as compared to men (based on support for Hypothesis 1). These findings add cross-national support for past research results suggesting that women typically engage in more environmentally-oriented behaviors overall (Blocker and Eckberg, 1997; Davidson and Freudenburg, 1996; McStay and Dunlap, 1983; Tindall, Davies, and Mauboules, 2003; Zelezny, Chua, and Aldrich, 2000).

Second, both men and women typically participate in fewer public environmentally-oriented behaviors as compared to private (based on support for Hypotheses 2 and 3, as well as rejection of Hypothesis 4). Again, these findings provide cross-national support for previous research suggesting little difference in environmental-activism levels (public-sphere behaviors) across genders (e.g., Tindall, Davies, and Mauboules, 2003). This finding also provides support for the low-cost hypothesis, although demonstrating lesser gender differentials than might be expected. Instead, we find that individuals, regardless of gender, are more likely to engage in environmental behaviors that are presented within the routine of daily living (e.g., recycling, driving less, etc.), activities that perhaps involve less "cost" than activist endeavors, which may present themselves less frequently and/or require greater levels of effort and involvement (Diekmann and Preisendörfer, 1998).

Third, and particularly intriguing, is the general pattern that emerges with regard to gross national income per capita (GNI). Although the link to national wealth was not initially an analytical focus of this investigation, GNI was used as an organizational tool in the presentation and interpretation of the results and, as such, it became apparent that the nations at the upper end of the wealth distribution are those for which Hypothesis 1 is most typically confirmed. That is, in Japan, Norway, the United States, Northern Ireland, Great Britain, the Netherlands, East Germany, West Germany, Ireland, Canada, Australia, and Italy, women engage in substantially more private behaviors than men. Additionally, in the top five GNI nations, women engage in significantly more private behaviors relative to public ones. Thus we see that the anticipated across-gender distinctions are most apparent within these contexts.

In thinking through these patterns, we must first note that a majority of the nations included in the International Social Survey Program represent relatively industrialized economies. Still, many at the lower end of the national income distribution are Eastern European nations that represent national contexts with different structural processes related to shifts in political structure and economic production. This variety leads us to believe that the 22 nations incorporated within the ISSP do, in fact, allow for intriguing cross-national contrasts.

It might be tempting to suggest that the greater gender differentials found in the more wealthy contexts are accounted for with the "biographical availability" explanation, whereby women's increasing labor force participation constrains availability to engage in activism outside the home and makes it more likely that women will engage in environmentally-friendly behaviors that can be undertaken in the course of regular daily routines (e.g., Tindall, Davies, and Mauboules, 2003). However, Eastern Europe has historically experienced a chronic shortage of labor that greatly facilitated women's entrance into the workforce despite strong traditional gender ideologies that perpetuated expectations of women's reproductive roles as well (Charles, 1993). For example, in Czechoslovakia, although women make up almost 50 percent of the workforce, attitudinal surveys demonstrated the persistent view that a woman's prime role is that of wife and mother (Charles, 1993). Indeed, little correlation exists between national GNI and the level of female labor force participation within our sample ($r = -0.18$, n.s.), suggesting that higher levels of biographical unavailability is likely *not* unique to women in wealthy nations.

Another effort at explanation is grounded in the variation of available behaviors. It might be logical to assume that fewer private behavioral opportunities exist in lower GNI contexts, given that the infrastructure necessary to support such behaviors may not yet be sufficiently developed. In this case, these contexts would be characterized by less potential variation on the dependent variable and, therefore, the lack of statistical significance in less wealthy nations may be the product of patterns in the data as opposed to true gender differences. However, exploration into this possibility revealed that the variation in available behaviors is not great enough to have resulted in the observed gender patterns based on GNI. Although less wealthy nations do tend to have *slightly* fewer available private behaviors, the differences are not substantial.

Disaggregating the measure of private environmental behaviors reveals high levels of recycling behavior among both men and women across the range of included nations, and even more gender variation is apparent with regard to the two other private behaviors. In wealthier nations, women are more likely than men to state that they buy organic produce when possible and, at least on occasion, leave the car at home for environmental reasons. However, this is not to say that in less wealthy nations, women do not engage in these behaviors as well. On the contrary, in the majority of less wealthy nations, both women *and* men express high levels of involvement in these private environmentally-oriented behaviors. Basically, the results suggest that in the majority of nations, both women and men report higher levels of involvement in private environmentally-oriented behaviors relative to public environmentally-oriented behaviors. Yet as GNI rises, this preference for private environmental behavior becomes increasingly feminized, although the greater gender gap in wealthier contexts remains a puzzle. In a sense, the gap is a product of lower levels of engagement by men in private

behaviors, suggesting that, perhaps, the biographical availability of *men* is different in wealthier contexts. Exploration into this intriguing possibility related to male gender role socialization is a topic for future research.

The contrasts of gender differentials as related to national wealth are also intriguing when situated within the larger literature on environmental concern and affluence. As noted above, in many nations at the lower end of the GNI distribution, a high proportion of individuals engage in environmentally-oriented behaviors when feasible, thereby providing some support for the contention that environmental concern (as manifested through behaviors) is not unique to residents of wealthy nations (e.g., Brechin and Kempton, 1994; Dunlap and Mertig, 1997).

This work is suggestive of several areas for continued research. First, future research conducted in a broader array of less developed and developing nations would yield additional, important insights related to national wealth, gender socialization, and environmental behaviors. Second, obviously, more detailed information related to cultural variation in gender roles and gender socialization would be invaluable in working through some of the differences uncovered here.

In sum, this project was designed to contribute a cross-national perspective to the literature on gender dimensions of environmental concern and environmentally-oriented behaviors; to our knowledge no such inquiries have focused on cross-cultural gender variations across a wide variety of national contexts. At the start, we aimed to contribute to understanding in three areas: (1) gender dimensions of environmental concern generally; (2) potential understandings of cross-cultural variation in traditional gender socialization; and (3) a better understanding of who *is*, and is *not*, engaging in environmentally-oriented behaviors within particular national contexts. With regard to the first, taken together, the results do, indeed, provide substantial evidence for cross-national gender differences in private environmental behaviors such as recycling, buying organic produce, or driving less, but little support for gender variation in public environmental behaviors such as supporting an environmental organization, signing petitions, or taking part in demonstrations. With regard to cross-cultural variation, we find an intriguing association between GNI and variation in private behaviors, with women engaging in more private behaviors relative to men, particularly in wealthier national contexts. Finally, with reference to who is engaging in environmentally-oriented behaviors, evidence here suggests that a preference for private environmentally-oriented behaviors typifies both genders across many nations.

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