

Thinking Globally and Acting Locally?: Geographical Dimension of Environmental Concern as Predictors of Pro-environmental Behaviors*

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Using the structural equation modeling, the present study analyzed the results of a survey of environmental attitudes conducted in Seoul, Korea to examine the extent to which perceptions of environmental issues at different geographical levels (local and global) influence pro-environmental behavior in everyday life. Concern about global environmental issues influenced pro-environmental behavior both directly and indirectly. As the theory of planned behavior suggests, behavioral intention to protect the environment mediated the relationship. In line with the endowment effect theory, people were more likely to engage in pro-environmental behavior when they were more content with the quality of environment in the neighborhood. However, the influence of the perception of local environmental conditions on pro-environmental behavior was mainly indirect via emotional attachment to a local community. Overall, ordinary people's perception of global environmental issues was a stronger predictor of individual pro-environmental behavior than was their perception of local environmental conditions, suggesting that "Think globally, act locally" is not merely a slogan for environmentalism, but also a description of what people are actually doing in everyday life. These findings therefore suggest that highlighting global environmental problems rather than focusing on local environmental problems would indeed be an effective communicative strategy to promote pro-environmental behavior in everyday life.

Keywords: *environmental concern, pro-environmental behavior, the endowment effect theory, place attachment, environmental communications*

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Introduction

A couple of years ago, at a symposium in Seoul, Korea where scholars and activists discussed how to promote environmentally friendly consumption among Koreans, a speaker criticized a local environmental movement organization for using a polar bear as its symbolic icon. Since polar bears living in the North Pole are not as peculiar to most Koreans as are aboriginal animals, argued the speaker, they cannot be good iconic images to encourage environmentally responsible behaviors among Koreans. Assuming that people would have a stronger emotional relationship with the flora and fauna of a local landscape than with those of distant regions, he proposed to use indigenous animals that might be more familiar to Koreans as a symbolic icon of environmentalism.

This claim sounds convincing, as it reflects a conventional wisdom that people are more likely to respond to local problems that they experience directly rather than to distant threats (deHaven-Smith 1988; Liberman, Trope, and Stephan 2007). Assuming people tend to show stronger emotional attachment to a specific local landscape, recent environmental communication research has also emphasized the importance of local message framing to promote pro-environmental attitudes and behaviors (O'Neill and Nicholson-Cole 2009; Scannell and Gifford 2013; Schweizer, Davis, and Thompson 2013). However, on the second thought, polar bears do not merely represent endangered species, but they are also used as an icon for many environmental movement organizations mainly because they symbolize 'global warming' responsible for the melting down of their habitat. The strategy of using polar bears as a symbolic icon for environmentalism therefore coincides with the assertion in political sciences that people tend to consider broader circumstances rather than local circumstances when formulating opinions on issues (Kinder and Kiewiet 1981; Lewis-Beck 1985). Thus, the speaker's criticism of the spatial scale of the icon used by environmental movement organizations brings up even bigger question about the relationship of the geographical facet of public perceptions of environmental problems with pro-environmental behaviors.

The geographic facet of public perceptions of environmental problems has long been noted in environmental attitude and behavior studies. A number of theoretical debates have been developed around the question of whether public concern about environment is primarily reflecting the direct experience of deterioration of environmental quality in the neighborhood or

whether it is in essence constructed socially through the mass media, education, and overall value changes (Dunlap and York 2008; Knight and Messer 2012; also see Dunlap 2010 for the theoretical debates on realism and constructivism in environmental sociology). The geographical scales of environmental concern have been also considered important when scholars attempted to construct more comprehensive measures of environmental concern (deHaven-Smith 1988; Xiao and Dunlap 2007; Konisky, Milyo, and Richardson 2008).

However, given the practical implications of environmental concern for enhancing environmental quality, a more important but less explored area analyzes the extent to which concern for environmental issues at different geographical levels influences actual pro-environmental behavior. Indeed, the practical concern for developing an agenda for action explains why public environmental concern has attracted much interest from both academics and the public, as it is assumed that increased public concern about environmental problems encourages people to act in environmentally responsible ways (Guagnano, Stern, and Dietz 1995; Oreg and Katz-Gerro 2006). If people's concern about the quality of their local environment is closely associated with their pro-environmental behaviors, this may suggest that communicative efforts to promote pro-environmental behavior can be more effective when they highlight local environmental issues. Conversely, if concern about global environmental problems predicts pro-environmental behavior better than does concern about the local environmental quality, this may suggest that an effective communication strategy for facilitating public engagement with pro-environmental behavior would be emphasizing far-reaching effects of global environmental problems.

By analyzing the results of a survey on environmental consciousness conducted in Seoul in South Korea, this study compares the ways in which concern about the quality of local environment and concern about global environmental problems influence pro-environmental behavior. Using the structural equation model, this study attempts to understand especially the mechanism of the influence by examining the role of two mediating factors, emotional attachment to local community and willingness to sacrifice money or convenience in life for the sake of the environment.

Literature review

Relationship between environmental concern and pro-environmental behavior

The environmental problems we face are mainly anthropogenic so that pro-environmental behavior, whether through collective activism or private actions, is critical to overcoming environmental problems. Research efforts have, therefore, focused on motivational factors underlying pro-environmental behavior, such as environmental concern, moral obligations, and social norms (Oreg and Katz-Gerro 2006; Steg and Vlek 2009). In this respect, research on ordinary people's environmental concern is used as an important factor to explain changes in policy or human behavior rather than to describe environmental concern itself.

A wide range of studies have long examined the link between what people feel and think about the environment and their pro-environmental behavior from various theoretical perspectives (Stern 2000; Steg and Vlek 2009). Assuming that attitudes predispose individuals to act in a certain manner, a line of studies has examined the causal process from attitudes (beliefs) to pro-environmental behavior (see Donald, Cooper and Conchie 2014). Each study highlights specific *mediating factors* through which attitudinal factors influence behavior indirectly. As a general model of deliberative behavior (reasoned action), for example, the central argument of the theory of planned behavior is that behavior is determined by *behavioral intentions*, which are in turn determined by various factors such as attitudes (beliefs) toward a behavior, subjective norms connected to the behavior, and perceived behavioral control regarding the behavior (Ajzen 2001; Oreg and Katz-Gerro 2006).

The role of concern about environmental quality underlying pro-environmental behavior also has been widely discussed in environmental attitude studies. Many empirical studies have shown that individuals who show higher level of environmental concern are more likely to act in environmentally responsible ways (Dunlap and Jones 2002; Bak and Huh 2010). Oreg and Katz-Gerro (2006), for example, proposed a model, which suggests that individuals' concern about the future of the environment and their concern about the threat from environmental problems influence their willingness to sacrifice their money or standard of living to protect the environment, which in turn affects pro-environmental behavior.

However, empirical studies have shown that the relationship between

environmental concern and pro-environmental behavior is inconsistent (Diekmann and Preisendorfer 1998). Some observers suggested that such inconsistent findings might have emerged because environmental concern is too broad; thus, its relationship with pro-environmental behavior is difficult to specify (Dunlap and Jones 2002). Since the concept of environmental concern is inherently multidimensional, it could be operationalized in many different ways (Guber 1996). For instance, not only can environmental concern be measured using various biophysical properties of nature, but also individuals' perception of the environment may differ according to diverse geographical scales (Xiao and Dunlap 2007; Xiao and McCright 2007). Furthermore, the relationship between environmental concern and pro-environmental behavior may depend, to an important extent, upon the dimensions of these concepts in the study. That is, the particular ways in which environmental concern and pro-environmental behavior are measured may influence the extent to which environmental concern can predict pro-environmental behavior. Any effort to elaborate the relationship between environmental concern and pro-environmental behavior, therefore, needs to pay greater attention to the dimensions of the abstract concept. The geographical scope of environmental concern is certainly one of the important dimensions of theoretical interest, as it has important implications for developing practical agenda to enhance pro-environmental behavior.

Geographical dimensions of environmental concern and pro-environmental behavior

Relatively little research has systematically scrutinized geographical level as a subject of environmental concern. Those that have done so have tended to limit their analyses to document that people perceive the seriousness of environmental problems differently depending on the geographical scale and that each type of the concern is associated with a different pattern of socio-demographic predictors (McAllister 1994; Rodriguez, Farnall, Geske, and Peterson 1998; Konisky, Milyo, and Richardson 2008).

The variability of environmental concern across issues of different geographical scales is an interesting research question, which highlights an important dimension of individuals' environmental concern. Bearing the theoretical and policy implications in mind, however, a more significant question regards its relationship with actual pro-environmental behavior. The previous literature has considered that the spatial dimension of environmental concern could influence pro-environmental behavior through either direct

experience of degraded environmental conditions at the community level or indirect information on environmental problems at the national or global level portrayed by the media (deHaven-Smith 1988; McAllister 1994).

The first approach emphasizes the relationship between perceptions of the quality of local environment and pro-environmental behavior, assuming that average citizens are motivated to act in environmentally responsible ways to see an improved environment as their own immediate interest (Sears and Lau 1983). This approach coincides with the construal level theory, which posits that people tend to perceive objects, places, people, or events that are further away from their immediate experience as more abstract; therefore, less concerning (Trope and Liberman 2003). It is also congruent with the literature on place attachment, which suggests that people are more likely to engage in place protective behaviors when they have an emotional relationship with specific places (Schweizer et al. 2013). Individuals are more likely to develop attachment to local nature not only because they would have stronger bonds to a specific local landscape, but also because they feel that their action can make a difference in an environment covering relatively small area (O'Neill and Nicholson-Cole 2009).

Overall, however, it remains unclear whether individuals' pro-environmental behavior should be understood mainly as a response to a threat from the environmental degradation in the neighborhood or as an effort to maintain the good quality of environment in the neighborhood with which they are satisfied. Implicitly, the former interpretation underlies the explanations of the environmental justice movement: the poor and racial minorities are expected to be more active participants in the community movement addressing environmental problems compared to the affluent and Whites because they tend to live in polluted areas and thus experience a threat from the environmental deterioration directly (Mohai 1990; Freudenburg 1991). From this position, people who suffer from degraded environmental conditions in the neighborhood are more likely to take action to protect the environment.

Alternatively, we may interpret the influence of concern about local environment using the endowment effect theory in behavioral economics. Emphasizing individuals' loss-averse orientation, the economic model asserts that individuals tend to dislike losses more than equivalent gains (Kahneman, Knetsch, and Thaler 1990). The endowment effect model therefore suggests that people would be more likely to engage in pro-environmental behavior *to retain* good environmental quality in the neighborhood rather than improve the deteriorated environment. As such,

pro-environmental behavior can be expected to be proportional to the extent to which people are content with the quality of environment in the neighborhood.

The second approach to explain the influence of the spatial dimension of environmental concern on pro-environmental behavior conjectures a strong relationship between individuals' perceptions of national or global environmental issues and pro-environmental behavior. This approach may rely on the sociotropic model in political sciences, which claims that people tend to employ information at a larger national level to form opinions; therefore, broader national circumstances rather than local ones influence public opinion formation on issues (Kinder and Kiewiet 1981; Lewis-Beck 1985). Adapted for environmental attitudes studies, the sociotropic model suggests that individual perceptions of environmental degradation within the nation as a whole shape environmental attitudes and behaviors rather than their immediate experiences in a local community.

This kind of reasoning can be easily extended to include the influence of environmental issues at the global scale. Since the 1990s, global environmental problems, such as loss of biodiversity, ozone depletion, and climate change, have attracted attention of both the public and the mass media. In particular, global climate change has been a focal point of the environmental politics for decades, even though it is often beyond personal experiences or the effective national policy. As Dunlap and Jones (2002) asserted a decade ago, environmental problems have become less localized and public awareness of them has also become more dependent on media sources than on firsthand experience. More recently, Beck also asserted the emancipatory potential of global environmental risk: "climate change tends to produce emancipatory consequences on politics, social movements, human actions and norms" for cosmopolitan visions and agendas (Han and Yun 2014: 164). If so, communicative efforts to promote environmental consciousness and pro-environmental behavior may be more effective when they highlight global environmental problems whose far-reaching effects tend to be viewed as more serious than local environmental issues (Uzzel 2000; also see Spence and Pidgeon 2010).

However, despite the popular discussion about the relationship between geographical facets of public perceptions of the environment and environmental behavior, little empirical research has investigated explicitly the association of individuals' concern about environmental issues at different geographical levels with their pro-environmental behavior.

Research questions

This study investigates and compares the influences of individuals' perceptions of local and global environmental conditions on their daily pro-environmental behavior to see which type of environmental concern can be more effectively utilized in communicative effort to promote pro-environmental behavior. In so doing, this study tests a model that both types of environmental concern influence pro-environmental behavior directly and indirectly. For the indirect influence of environmental concern, utilizing the theory of planned behavior and the notion of place attachment, this study hypothesizes that the intentions—willingness to make personal financial sacrifices or accept inconvenience in life to protect the environment—and emotional attachment to a local community mediate the relationship between environmental concern and pro-environmental behavior.

This study also tests whether the endowment effect theory can be applied to the relationship between environmental concern and pro-environmental behavior. That is, the present study asks if pro-environmental behavior in daily life would be fostered by aspirations to maintain good environmental quality in the neighborhood with which people are satisfied. Finally, in order to test the robustness of our model, we estimate an additional model, which controls for socio-demographic covariates.

Methods

Data collection procedure

The data for this study come from the Survey on Environmental Consciousness conducted in Seoul, South Korea. As a city with the population of about ten million, Seoul has long been known as the center of Korea in most aspects, including public opinion. The surveys were carried out by the Institute for Information Society Studies at Kyung Hee University in 2006.¹

¹ Although the survey dataset was made ten years ago, it still provides a unique opportunity to examine the relationship between geographical dimension of environmental concern and pro-environmental behavior. Unlike the present dataset which includes both measures of the levels of concern about local environmental conditions and global environmental issues, most other survey datasets (e.g., 2010 KGSS with an environment module) on environmental attitudes tend to include only one.

The 2,000 addresses were randomly drawn from lists of the administrative district. Then, from each randomly selected house, an adult between 20 and 79 years old was selected for the face-to-face interview with structured questionnaires. If there were several eligible household members, the adult with the closest upcoming birthday was interviewed. Finally, 987 participants completed the survey with the response rate of 49.4%.

Sample characteristics

The gender distribution of survey respondents was nearly equal with 46% male and 54 % female. Their average age was 38.3 ($SD = 12.8$), with 62.9% being married. About half of the sample (48.3%) had at least some college education, while 7% had only middle school education or less. A total of 44.9% of the survey sample reported household income under 40 million won before tax on an annual basis, while 10.4% reported over 80 million won. On average, respondents had lived in the community where they lived at the point of survey for 10.7 years ($SD = 9.6$). Compared with Population and Housing Census of Korea in 2005, those with higher educational attainment turned out to be slightly over-represented. However, overall, the sample reflects the general population in terms of other demographic characteristics.

Measures

Pro-environmental behavior (PEB)

This study measured the respondents' pro-environmental behaviors in the private sphere. Pro-environmental behavior was measured using the question: "Taking environment into consideration, have you done the following actions during the last 12 months?" The responses to the five actions were used as indicators of the latent variable PEB: participation in recycling (PEB1), purchasing household products that are better for the environment (PEB2), saving water consumption (PEB3), saving energy at home (PEB4), and purchasing chemical-free vegetable (PEB5). Each item was measured on a four-point Likert-type scale ranging from 'hardly (1)' to 'always (4).'

Perceptions of local environmental quality (LOCAL)

Perceptions of local environmental conditions were measured by asking "How much are you satisfied with your neighborhood environment?" The

three response items were used as indicators of the latent variable LOCAL: Cleanness of air (Local1), Cleanness of water (Local2), and Abundance of green nature (Local3). The responses to each item were measured on a 4-point ordinal scale ranging from “dissatisfied (1)” to “satisfied (4).” By inquiring about the level of satisfaction with the quality of environment in the neighborhood, instead of asking about the level of participants’ concern about environmental issues in the neighborhood, the questionnaire was designed to test a hypothesis drawn from the endowment effect theory.

Global environmental concern (GLOBAL)

The level of concern about global environmental issues was measured by a series of items assessing global environmental issues. The main question inquired, “To what extent are you concerned about the following global environmental issues?” Responses to five global environmental issues—ozone layer destruction (Global1), acid rain (Global2), global warming (Global3), destruction of forest (Global4), and marine pollution (Global5)—were used as indicators of the latent variable GLOBAL. Each item was measured on a 4-point ordinal scale ranging from “not at all (1)” to “very much (4).”

Intention to sacrifice (INTENT)

This latent variable measured willingness to make personal financial sacrifices or accept inconvenience in life to protect the environment. Three items used as indicators included accepting inconvenience in life for environmental protection (*Intention1*), willingness to pay a new tax for environmental protection (*Intention2*), and environmental-economic tradeoff (*Intention3*). Each of these items consisted of two conflicting statements: one for indicating willingness to accept financial sacrifices or inconvenience in life to protect the environment and the other for indicating opposite views. Respondents were asked to choose a statement which is closer to their own point of view and the responses were dichotomized, with a score of 1 given to the statement representing willingness to sacrifice for environmental protection and 0 given to the other statement, “others,” and “don’t know.”

Attachment to the local community (ATTACH)

To test whether individuals’ emotional attachment to their neighborhood mediates the influence of LOCAL on PEB, the level of attachment to the local community (ATTACH) was also assessed by asking how much emotional attachment respondents feel towards the local community where they currently live and measured on a 4-point ordinal scale ranging from “not at

all (1)” to “very much (4).” Since there is only one indicator measure, ATTACH was assumed to be measured without measurement errors.

Covariates

Socio-demographic characteristics were reported to have significant effects on both environmental concern and pro-environmental behavior (Xio and McCright 2007). Thus, we attempted to test the robustness of our model by introducing gender, age, educational attainment, and household income as covariates in the analysis. Gender was measured as a dummy variable with males as the reference category while age was measured by the number of years. While educational attainment was measured by four categories of “middle school or less,” “high school,” “vocational school/community College,” and “college or graduate school,” this study used the number of years needed to complete each type of school. Household income was measured with eight ordinal categories from “less than 20 million won” to “over 200 million won.” This study used the mid-point of each category after taking its natural logarithm.

Data analysis

To examine the influence of environmental concern on pro-environmental behavior, this study analyzed structural equation models (SEM) using LISREL 8.8. First, we analyzed the measurement model using Confirmatory Factor Analysis (CFA) to ensure the validity and reliability of the measure of the latent constructs. Then, we analyzed the structural model to test the relationship among the latent factors (see Fig 1). We used the listwise deletion method for missing cases, which resulted in the loss of 12.6% of the data. Overall, the results were almost identical in terms of the sign and size of estimates as well as statistical significance, even though the model in Fig 1 was analyzed with the data in which missing cases were imputed by the sample mean.

Since the indicator items of latent variables in the present study were measured by ordinal categories, the maximum likelihood (ML) estimation based upon a multivariate normal distribution could have led to biased estimates and invalid statistical hypothesis-testing (Bollen 1989; Byrne, 2001). Jöreskog and Sörbom (1993) proposed the distribution-free estimation procedure instead of the usual ML estimation with the moment correlation matrix to analyze ordinal data. Following their suggestion, this study analyzed the asymptotic covariance matrix and polychoric correlation matrix

using weighted least squares estimation.

We assessed model fit by examining the chi-square statistic, root mean squared error of approximation (RMSEA), and comparative fit index (CFI). The usual criteria for good model fit are a non-significant chi-square, $\chi^2/df < 3$, RMSEA $< .08$, and CFI $> .95$ (Bollen 1989; Hu and Bentler 1999).

Results

Pro-environment behavior

As shown in Table 1, significant differences emerged in the level of participation for each type of pro-environmental behavior. Recycling showed the highest level of participation, as over 63% of respondents answered that they always recycle. This may reflect the fact that curbside collection of recyclable materials is required by law in Seoul. Regarding saving behaviors, about half of respondents answered that they always make an effort to save energy and water. In contrast, the level of participation in purchasing green products turns out to be rather low. Less than 15% of respondents answered that they always purchase green household products or chemical free vegetables. This may in part be due to the higher cost and limited availability of these products. Notwithstanding differences, the levels of participation in all five pro-environmental behaviors are closely associated with each other, as indicated by the factor loadings in Table 2.

TABLE 1
PERCENTAGE OF RESPONDENTS PARTICIPATING IN EACH PRO-ENVIRONMENT
BEHAVIOR

Indicator items	Hardly	Seldom	Sometimes	Always	D/K
Recycling	1.3	7.6	27.8	62.9	.4
Purchasing products good for environment	8.8	28.3	46.0	14.7	2.2
Reducing water consumption	1.1	13.7	35.5	49.4	.2
Reducing fuel use	1.2	15.7	32.1	50.4	.6
Purchasing organic or chemical free vegetables	11.1	33.7	40.2	12.4	2.6

Measurement model

We first analyzed the measurement model with four latent constructs using CFA. In the model, all the latent variables were set as distinct but inter-related constructs. The measurement model fit the sample data good, $\chi^2(110) = 232.35$ ($p < .001$); $\chi^2/df = 2.11$; RMSEA = .03; CFI = .96. All indicator loadings were statistically significant ($p < .001$), ranging from .46 to .88 (standardized estimate).

The results showed that the model could improve the goodness of fit significantly when the error term of PEB2 correlated with the error term of PEB5 and the error term of PEB3 correlated with the error term PEB4. These correlations suggest that these items indicate the same types of behavior and, thus, use the similar wordings: both PEB2 and PEB5 indicate “purchasing” behavior while both PEB3 and PEB4 indicate “saving” behavior. The model was therefore subsequently respecified with two freely estimated covariance parameters between these error terms. The final measurement model exhibited significant improvement in fit, $\chi^2(108) = 194.81$ ($p < .001$); $\chi^2/df = 1.80$; RMSEA = .03; CFI = .97. Additionally, the measurement model offered reliability coefficients of latent constructs within the acceptable range, .70 for PEB, .83 for LOCAL, .92 for GLOBAL, and .71 for INTENT. Table 2 shows the factor loadings and covariances estimated in the final measurement model.

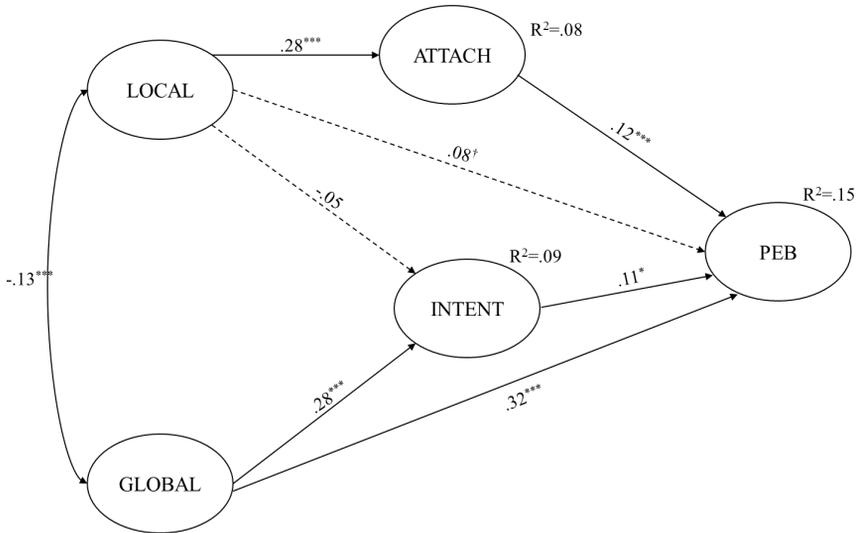
Structural model

To test the influence of concern about local environmental conditions (LOCAL) and concern about global environmental problems (GLOBAL) on pro-environmental behavior (PEB), we estimated the structural model shown in Fig. 1. In the model, LOCAL and GLOBAL were specified to influence PEB not only directly but also indirectly. Intention to sacrifice for the environment (INTENT) was assumed to mediate the influence of LOCAL and GLOBAL on PEB while emotional attachment to the local community (ATTACH) was assumed to mediate the influence of LOCAL on PEB. Finally, two exogenous variables, LOCAL and GLOBAL, correlated with each other. Some of the unexplained variances among endogenous mediator variables are usually assumed to correlate with each other. Yet, this study deleted the covariance term between INTENT and ATTACH from the model because it was not statistically significant at $p < .05$. Overall, the model fit the data well, $\chi^2(110) = 219.12$ ($p < .001$); $\chi^2/df = 1.99$; RMSEA = .032; CFI = .96.

TABLE 2
ESTIMATES OF THE MEASUREMENT MODEL: FACTOR LOADINGS AND
COVARIANCES SPECIFIED IN THE MODEL

Indicator items	Factor loadings	Covariance	SE	t-Value	Mean(SD)
Pro-environmental behavior (PEB)					
PEB1	1.00/.71		---	---	3.53(.69)
PEB2	.68/.63		.06	11.92	2.68(.84)
PEB3	.89/.67		.06	14.30	3.34(.75)
PEB4	.90/.69		.06	14.07	3.32(.78)
PEB5	.53/.54		.06	9.39	2.55(.85)
Perception of local environmental quality (LOCAL)					
Local1	1.00/.88		---	---	2.37(.92)
Local2	.89/.78		.04	22.56	2.28(.90)
Local3	.83/.72		.04	21.52	2.49(.97)
Global environmental concern (GLOBAL)					
Global1	1.00/.81		---	---	3.40(.70)
Global2	1.07/.87		.04	24.09	3.40(.67)
Global3	1.04/.83		.04	26.47	3.54(.65)
Global4	1.06/.86		.04	24.89	3.44(.66)
Global5	.96/.78		.04	22.19	3.27(.74)
Intention to sacrifice (INTENT)					
Intent1	1.00/.83		---	---	.68(.47)
Intent2	.55/.46		.07	8.08	.43(.50)
Intent3	.79/.68		.10	8.31	.44(.50)
Attachment to the local community (ATTACH)					
Attachment	1.00/1.00		---	---	2.96(.79)
Covariance between PEB2 and PEB6		.22/.23	.04	5.86	
Covariance between PEB3 and PEB4		.20/.21	.09	2.19	

NOTE.—Table estimates represent unstandardized estimates. Standardized estimates are given in italics.



NOTE.—PEB = Pro-environmental behavior; LOCAL = Perception of local environmental quality; GLOBAL = Global environmental concern; INTENT = Intention to sacrifice; ATTACH = Attachment to the local community. Dotted lines indicate that the estimates are not statistically significant at $p < .05$.

† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

FIG. 1.—Results from a latent variable path analysis to predict pro-environmental behavior (Standardized estimates).

Figure 1 and Table 3 show that GLOBAL influences PEB both directly and indirectly. The model analysis showed a positive path coefficient from GLOBAL to PEB ($\gamma = .32$, $p < .001$, hereafter all path coefficient estimates are standardized estimates). The estimates for the path from GLOBAL to INTENT and from INTENT to PEB were also positive and statistically significant ($\gamma = .28$, $p < .001$ and $\beta = .11$, $p < .05$ respectively). By contrast, the influence of LOCAL on PEB was mainly mediated by ATTACH. While the paths from LOCAL to ATTACH and from ATTACH to PEB were all positive and statistically significant ($\gamma = .28$, $p < .001$ and $\beta = .12$, $p < .01$ respectively), the direct effects of LOCAL on PEB and INTENT turned out to be small and statistically insignificant ($\gamma = .08$, $p > .05$ and $\gamma = -.05$, $p > .05$, respectively). As a result, the estimated total effect of GLOBAL was more than three times greater than that of LOCAL (.35 vs .11).

TABLE 3
ESTIMATES OF THE STRUCTURAL MODEL TO PREDICT PRO-ENVIRONMENTAL
BEHAVIOR

Dependent variables	Predictors	γ	β	SE	t-Value	R ²
PEB	INTENT		<i>.10/.11</i>	.05	2.15	.15
	ATTACH		<i>.09/.12</i>	.03	2.87	
	LOCAL	<i>.07/.08</i>		.04	1.79	
	GLOBAL	<i>.30/.32</i>		.04	6.84	
INTENT	LOCAL	<i>-.05/-.05</i>		.04	-1.13	.09
	GLOBAL	<i>.29/.28</i>		.05	6.27	
ATTACH	LOCAL	<i>.32/.28</i>		.04	8.14	.08

NOTE.—PEB = Pro-environmental behavior; LOCAL = Perception of local environmental quality; GLOBAL=Global environmental concern; INTENT = Intention to sacrifice; ATTACH = Attachment to the local community. Table estimates represent unstandardized estimates. Standardized estimates are given in italics.

Robustness check

To test the endogeneity problem, we introduced four socio-demographic covariates—gender, age, educational attainment, and household income—into the model in Fig. 1.² In the respecified model, these covariates were assumed to influence all endogenous variables (PEB, INTENT, and ATTACH) directly. The goodness of fit statistics were $\chi^2(158) = 377.40$ ($p < .001$), $\chi^2/df = 2.39$; RMSEA = .038, and CFI = .95. Table 4 shows estimates of the structural model with covariates.

Even when controlling for covariates, overall, the structural relationship among latent variables in Figure 1 remained the same in terms of the sign and statistical significance, while the size of estimates changed slightly. GLOBAL showed greater influence on PEB than did LOCAL (.23 vs .08 in total effect). Additionally, GLOBAL exerted direct influence while LOCAL exerted only indirect influence on PEB mediated by ATTACH. An exception was the influence of INTENT on PEB, which became much smaller and

² To keep the sample size unchanged for the robustness check, the missing cases in the covariates (1.4% in education and 14.1% in household income) were replaced by the sample mean.

TABLE 4
ESTIMATES OF THE STRUCTURAL MODEL TO PREDICT PRO-ENVIRONMENTAL
BEHAVIOR (WITH COVARIATES)

Dependent variables	Predictors	γ	β	SE	t-Value	R ²
PEB	INTENT		<i>.01/.02</i>	.04	.33	.39
	ATTACH		<i>.10/.13</i>	.03	3.51	
	LOCAL	<i>.03/.04</i>		.03	.91	
	GLOBAL	<i>.19/.22</i>		.04	5.21	
INTENT	LOCAL	<i>-.01/-.01</i>		.04	-3.0	.16
	GLOBAL	<i>.26/.25</i>		.05	5.61	
ATTACH	LOCAL	<i>.34/.31</i>		.04	9.04	.10

NOTE.—PEB = Pro-environmental behavior; LOCAL = Perception of local environmental quality; GLOBAL = Global environmental concern; INTENT = Intention to sacrifice; ATTACH = Attachment to the local community. Table estimates represent unstandardized estimates. Standardized estimates are given in italics. This model included gender, age, educational attainment, and household income as covariates, although the estimates of their effects are not presented.

statistically insignificant when the model controlled for covariates (from $\beta = .12$, $p < .01$ in Table 3 to $\beta = .02$, $p > .05$ in Table 4). The results thus suggest that the relationship between INTENT and PEB is, to a large degree, due to the effect of common factors, i.e., socio-demographic variables.

Discussion

By analyzing the influence of public perceptions of the quality of local environment and global environmental issues on pro-environmental behavior in everyday household life, this research supports the complex relationships between the geographic dimension of environmental concern and pro-environmental behaviors. While both types of concern about environment exerted significant influence on pro-environmental behavior, each revealed distinct patterns. Four main findings deserve further consideration in future research on developing an agenda to promote environmentally responsible behavior.

First, this research demonstrates the multidimensionality of environ-

mental concern. While the multidimensionality of environmental concern has long been discussed, relatively few studies have explored explicitly how different dimensions of environmental concern translate into pro-environmental behavior (Tarrant and Cordell 1997). By illustrating that the particular ways in which environmental concern is measured determine, at least in part, the extent to which environmental concern can predict environmental behavior, this research calls for paying greater attention to the varying dimensions of the complex concepts, including geographical facets of environmental concern. The same finding can apply to pro-environmental behavior, which includes not only private actions in everyday household life, but also more politically oriented actions in the public sphere, such as participating in a street protest on environmental issues (Stern 2000). It is also an important question, "What will happen if items for the measure of pro-environmental behavior are ones having predominately a local impact?" Therefore, further research needs to explore the relationships between the geographic dimension of environmental concern and such distinct types of pro-environmental behaviors separately.

Second, while demonstrating distinct patterns of the relationship between each type of concern about environment and pro-environmental behavior, overall, this research suggests that concern about global environmental issues may yield greater influence on pro-environmental behavior than does concern about local environmental conditions. As expected, people were more likely to engage in pro-environmental behavior, as their concern about global environmental problems increased. In addition to the direct influence, concern about global environmental issues influenced pro-environmental behavior indirectly through its influence on intention to act to protect the environment, as suggested by the theory of planned behavior. As people became more concerned about global environmental problems, they were more willing to sacrifice money or convenience in life for the environment, which in turn encouraged actual pro-environmental behavior. However, the level of satisfaction with the quality of environment in the neighborhood had a significant total and indirect effect mainly mediated by emotional attachment to the local community, but not a significant direct effect on pro-environmental behavior.

This research thus suggests that "Think globally, act locally" may not be just a slogan for environmentalism but a description of what people are actually doing in their everyday life. This finding is consistent with previous literature supporting the sociotropic model that people consider broader circumstances rather than local ones when they form opinions on

environmental policy (McAllister 1994; Rodriguez et al. 1998) and Beck(2014)'s claim that global environmental problems, notably climate change, tend to encourage social movements toward more reflexive society. Yet, this study extends the earlier research limited to the analysis of the environmental policy support and politics to the analysis of the realm of pro-environmental behaviors in everyday life.

A better understanding of the factors associated with pro-environmental behavior would help design effective communication programs for environmental protection. This research suggests that an effective strategy would be to highlight global environmental issues, such as global climate change and the Great Pacific Garbage Patch, rather than emphasize local environmental degradation to encourage public participation in pro-environment behavior. For example, although very few individuals would be able to see endangered polar bears in real life, their image due to global warming depicted by the media might effectively promote pro-environmental behavior, regardless of regions. It might happen partly because people tend to perceive global environmental problems as more threatening issues than local environmental problems (Uzzell 2000).

This does not necessarily mean that the relationship between concern about local environmental conditions and pro-environmental behavior can be downplayed. As this research shows, the level of satisfaction with the quality of environment in the neighborhood also has positive indirect effect on pro-environmental behavior, although the effect is smaller than the level of concern about global environmental problems. As such, pro-environmental behavior would be facilitated most effectively if we can stimulate concerns about global and local environmental problems simultaneously. For example, we can develop messages in which global environmental issues are communicated in terms of their local effects. This is congruent with previous studies which emphasized the benefits of localizing climate change messages for enhancing climate change engagement (O'Neill and Nicholson-Cole 2009; Scannell and Gifford 2013; Schweizer et al. 2013). Yet, in cases where we have to emphasize either local environmental conditions or global environmental problems in a communication program for environmental protection, this study suggests that the latter may be able to prompt pro-environmental behavior more effectively.

Third, this research revealed a complex relationship between perceptions of local environmental conditions and pro-environmental behavior. In line with the endowment effect theory, this research found that people were more likely to engage in pro-environmental behavior when they were more content

with the quality of environment in the neighborhood. Coinciding with Hahn's (2002) research, which found that residents in polluted areas in Korea were less likely to participate in recycling programs, this finding suggests that people may engage in pro-environmental behavior more actively when they have better environmental conditions in their community. It further implies that, to facilitate people's engagement in pro-environmental behavior, perhaps we should not emphasize problems in the local environment too much so as not to decrease the level of people's satisfaction with environment in their neighborhood.

Still, there have been debates on the effects of environmental degradation on environmental attitudes and pro-environmental behavior which often concerned the difference in environmentalism between the North and the South: while environmentalism in the North ("full stomach environmentalism") may reflect broad value changes, such as post-materialism, environmentalism in the South ("empty belly environmentalism") may reflect people's firsthand experiences with degraded environmental conditions and declining resource availability (Martinez-Alier 2002; Dunlap and York 2008). Certainly, we need more research to better understand the relationship between perceptions of local environmental conditions and pro-environmental behavior. Meanwhile, in addition to the North-South difference in environmentalism, it should be noted that the research supporting the endowment effect theory has tended to examine pro-environmental behaviors in the private sphere while the research emphasizing the effect of environmental degradation has tended to focus on pro-environmental behaviors in the public sphere (Mohai 1990; Martinez-Alier 2002; Dunlap and York 2008).

Finally, this research confirmed the value of the notion of place attachment in predicting pro-environmental behavior. Those who are content with the quality of environment in their community are more likely to feel emotionally attached to their community, and in turn, those who have higher levels of emotional attachment to their community are more likely to engage in pro-environmental behavior in everyday life. While many researchers have recently discussed the relationship between place attachment and pro-environmental behavior (Schweizer et al. 2013; Beery and Wolf-Watz 2014), this research contributes to the existing literature by focusing on the mediating role of emotional attachment to a local community in the relationship between perceptions of local environmental conditions and pro-environmental behavior.

The limitations of the present study deserve attention. One is that only

reported behaviors were analyzed. Since pro-environmental behavior is regarded as socially desirable in most societies, including Korea, respondents might give biased reports of their behaviors. Further research also needs to analyze different samples and include various research designs to test the internal and external validity of the findings of this research. Especially the limitation concerns the use of cross-sectional data and the use of ad-hoc measures of unknown psychometric quality, for which a strong causal claim is not allowed. Accordingly, future studies should utilize longitudinal data to strengthen the findings of this study.

Conclusion

A number of scholars have long examined factors influencing environmentally responsible behavior not only for scholarly interests but also for practical reasons. This research contributes to the extant literature on environmental behavior and the programs for environmental protection by exploring the complex relationships of the geographical dimension of public perceptions of environment with pro-environmental behavior in everyday household life. Overall, this research found that while concern about global environmental issues and concern about local environmental conditions both influenced pro-environmental behavior, concern about global environmental issues provided better predictive power. This research further suggests that, since both types of concern about environment had positive influence on pro-environmental behavior, communication programs to foster pro-environmental behavior would be more effective when they are designed to link global environmental issues than when they focus primarily on local environmental conditions. Given that changes in people's attitudes and behavior through environmental communications have been rather slow (Otto and Kaiser 2014), we need to encourage such efforts to develop more effective communicative strategies in order to accelerate the changes.

This research also highlights the roles of two mediating factors, emotional attachment to a local community and willingness to sacrifice money or convenience in life to protect the environment, to explain the relationship between the geographical dimension of public perceptions of environment and pro-environmental behavior. Given the complicated relationships between environmental concern and pro-environmental behavior, further empirical research on the relationship between distinct dimensions of environmental concern and pro-environmental behavior

would contribute much to the theory of environmental concern and the efforts to design programs to encourage public participation in pro-environmental behavior. To explain the complex relationships, we should also take advantage of diverse social theories in social sciences beyond environmental studies.

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