

FREE-MARKET IDEOLOGY AND ENVIRONMENTAL DEGRADATION

The Case of Belief in Global Climate Change

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ABSTRACT: The effects of support for free-market ideology and environmental apathy were investigated to identify some bases for not believing in global climate change. A survey of community residents' ($N = 185$) beliefs about global climate change also assessed ecocentrism, anthropocentrism, perceived knowledge about climate change, and self-efficacy. The beliefs that global climate change is not occurring, is mainly not human caused, will also have positive consequences and that weaker intentions to undertake ameliorative actions were significantly associated with greater support for free-market ideology, greater environmental apathy, less ecocentrism, and less self-efficacy. About 40% of the variance in each belief and 56% of the variance in the behavioral intention was explained by these factors. The results suggest that the relation between support for free-market ideology and the beliefs about global climate change is mediated by environmental apathy.

Keywords: *global climate change; environmental attitudes; environmental apathy; free-market ideology*

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Global climate change is one of the most significant environmental issues in recent years (National Research Council, 1999). Natural scientists report many possible negative environmental changes as a consequence of global climate change, such as increases in the global sea level, more frequent droughts, and the destruction of ecosystems on a global level. Despite these serious potential effects, beliefs about global climate change by members of the general public are not well understood, and certainly one encounters some members of the public who express skepticism that change is occurring.

Inferences from the study of other natural hazards and disasters might be useful, except that at least three characteristics of global climate change distinguish it from other natural hazards and disasters. These characteristics may render the risk perception of global climate change different from that of other, better understood natural disasters or hazards. First, there remain pockets of uncertainty among scientists as to whether global warming actually is occurring, in contrast to, for example, pollution or earthquakes. Second, if climate change is occurring, it will do so much more gradually than other environmental problems, which makes it harder to notice. Third, the extent to which it is caused by human activity (as opposed to natural processes or cycles) remains uncertain and controversial.

Among the few studies that have examined lay beliefs about global climate change, Weber (1999) investigated the relations between expectations, beliefs, and adaptive responses to global climate change in a sample of Illinois cash-crop farmers. Just more than one half of the sample did not expect that climate change would happen in the next 20 or 30 years. Weber also found that farmers who believed in climate change were more likely to distort their memories about past weather in the direction predicted by climate change models and tended to take some adaptive measures to reduce the negative consequences of climate change.

The results from a 1992 Gallup survey conducted in six countries (Canada, United States, Mexico, Brazil, Portugal, and Russia) portray another picture of public beliefs about global climate change (Dunlap, 1998). Although the majority in four of the six countries rated global climate change as a very serious problem, they tended to rate it as less serious than ozone depletion, rainforest destruction, and water and air pollution. Most participants did not believe that they understood global climate change very well; however, unlike Weber's (1999) participants, they also believed that it had already

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begun to happen or would begin happening within a few years. Although this survey provided a good picture of the general public's perception of global climate change, it included only demographic variables (age, gender, education, and the residency) and did not investigate other possible factors that may influence the perception.

Unlike the above two studies, O'Connor, Bord, and Fisher (1999) investigated the relations among risk perception of global climate change, environmental attitude, and the willingness to address global climate change (in terms of five different voluntary actions, such as carpooling, and voting intentions for relevant regulatory policies). Environmental attitude was measured using the New Environmental Paradigm scale (Dunlap & Van Liere, 1978), and risk perception was measured in terms of the expectation that the problem is occurring, the expectation that the consequences are negative, and knowledge of the causes. Their regression analysis of willingness to address global climate change on environmental attitude, three risk perception measures, and demographics (age, gender, and education) showed that five of the seven predictors, except for age and education, were statistically significant, although collectively they explained a relatively small amount (17%) of the variance in willingness to address the problem. They also concluded that knowledge about the causes of the global climate change would foster behavioral intentions to take action on these causes.

The current study extends this research by addressing three issues. First, using measures of climate change perceptions similar to those used by O'Connor et al. (1999), it explored the factors that affect beliefs about global climate change. O'Connor et al. used the three risk perceptions described above as independent variables to predict behavioral intentions but did not explore the factors that affect them. We examined three beliefs concerned with global climate change: the likelihood that it exists, whether it has human or natural causes, and whether its consequences are negative or positive.

Second, most investigations of the perceived risks associated with global climate change have been framed in a way that assumes the phenomenon will bring about serious negative consequences and that it is largely a result of human activities (e.g., Bostrom, Morgan, Fischhoff, & Read, 1994; Read, Bostrom, Morgan, Fischhoff, & Smuts, 1994). This may overlook the fact that not all laypersons believe that global climate change is under way, or that its consequences are always negative. We suggest that research should be framed in a way that avoids prejudging the existence and outcomes of climate change; such prejudging on researchers' part may alienate laypersons who do not subscribe to the majority assessment of global warming and its effects and may cause others to respond in socially desirable ways. By framing the question neutrally, it should be possible to identify factors that contribute to

disbelief. Specifically, we proposed two constructs to explain the lack of belief in global climate change: support for free-market ideology and environmental apathy. These factors are discussed in more detail below.

Finally, in attempting to explain the willingness to act against global climate change, it is important to consider self-efficacy (Bandura, 1977, 1982). Specifically, we use the concept of self-efficacy of cooperation (Kerr, 1992), which we describe below. By including this concept, we expected that willingness to act will be better explained.

SUPPORT FOR THE FREE-MARKET SYSTEM

Some have suggested that the free-market ideology is one of the culprits of environmental degradation. For example, Gladwin, Newbury, and Reiskin (1997) claimed that “northern elites” (i.e., Europe, North America, and Japan) have an “unsustainable mind” (p. 238) that contributes to environmental problems such as air pollution. Gladwin et al. claimed that one source of unsustainable thinking is “an addicted contemporary mind” (p. 240) that has been powerfully programmed to believe in efficiency, economic growth, and techno-optimism. They further argued that this “contemporary mind” is programmed to favor market efficiency over social justice and quantitative growth over qualitative growth.

Shrivastava (1995) suggested a similar hypothesis: “Free markets are responsible for . . . all environmental problems. The basic assumptions are that negative consequences of economic production are not very severe. They believe all ecological impacts can be reduced to economic measures of costs and benefits” (p. 214).

Axelrod and Suedfeld (1995) examined the claim that capitalism is one of the three structural systems (with modern technology and Judeo-Christian religious traditions) that are inconsistent with environmental preservation. They argued that “In a truly open free-market system there is no viable mechanism for preventing overexploitation [of limited natural resources] from occurring” (p. 189). However, they also suggest that it is not the economic system per se but rather the values and beliefs associated with the economic system that are inconsistent with environmental preservation.

The current study aimed to examine empirically the relation between one’s attitude toward free-market ideology and beliefs about global climate change. Based on the arguments of Gladwin et al. (1997) and Shrivastava (1995), we hypothesized that favorable attitudes toward the free-market system are associated with beliefs that global climate change is not occurring or will have few negative consequences.

Underlying this assumption is the optimism associated with free-market ideology. Because the free-market system is supposed to take care of everything in the end (i.e., the “invisible hand,” Smith, 1776), there is not much for an individual to be concerned about regarding the environment.

Concerning the attributed causes of global climate change, we hypothesized that those who support free-market ideology are more likely to believe that the causes are not human but natural. This hypothesis is based on the optimism described above and also on the notion of egocentric bias (e.g., Kunda, 1990; Wade-Benzoni et al., 2002); individuals tend to interpret information in a self-serving manner. Those who subscribe to the free-market ideology often assume that the market should be left alone and that government interference is undesirable. From this perspective, it is more self-serving to believe that human actions are not the causes of global climate change, and therefore government regulation of industry is unnecessary.

ENVIRONMENTAL ATTITUDES

Few studies have investigated the relation between global climate change beliefs and general environmental attitudes. Among these, O'Connor et al. (1999) found that more positive environmental attitudes as measured by the New Environmental Paradigm (NEP; Dunlap & Van Liere, 1978) were related to greater willingness to act against global climate change. Kuhn (2000) also found that individuals with greater environmental concern (again, using the NEP) perceived greater risks under uncertain information across five hazards (nuclear power plants, groundwater contamination, extinction of endangered rare species, chemical plant disposal, and air pollution) and that environmental concern was a significant predictor of perceived risk.

We chose Thompson and Barton's (1994) ecocentric and anthropocentric scales to measure environmental attitudes. Ecocentric individuals value nature for its own sake and believe that nature deserves protection for its intrinsic value. Anthropocentric individuals believe that nature should be protected because of its value in enhancing the quality of life for humans. Because these scales measure more subtle motivational differences in pro-environmental attitudes than more general scales, such as the NEP, we expected them to be more useful in predicting beliefs about global climate change. Thompson and Barton claimed that the different orientations in motivation would particularly manifest themselves when performing an ecological behavior that is difficult; that is, ecocentric individuals should perform more ecological behaviors compared to anthropocentric individuals

even when these actions involve discomfort, inconvenience, and expenses that reduce their material quality of life. Because taking action against global climate change is considered to be difficult, and presumably involves self-sacrifice (e.g., reducing car use), ecocentrism should predict the intention to take action against global climate change more strongly than anthropocentrism.

Furthermore, Thompson and Barton's (1994) scales include environmental apathy, which reflects a lack of interest in environmental issues and the belief that environmental issues have been exaggerated. One might predict, then, that more persons who are environmentally apathetic will underestimate the risks of global climate change. We also hypothesized that environmental apathy will be correlated with support for free-market ideology because both share optimistic indifference to environmental issues.

SELF-EFFICACY

Facing a diffuse and seemingly distant environmental problem such as global climate change, from which a diverse range of consequences can occur, some individuals may believe that their own efforts will not significantly ameliorate the negative consequences, whereas others may think that their efforts will make a difference. The belief that the things one can do will make a significant difference should be a prerequisite for the willingness to make any personal effort, in this case to combat global climate change.

The type of efficacy used here is the equivalent of what has been called "self-efficacy of cooperation" (Kerr, 1992, p. 60) in the social dilemma literature, which reflects the belief that one's cooperative behavior has a significant effect on the outcome of a large group. This kind of self-efficacy may be distinguished from Bandura's (1977, 1982) original concept of self-efficacy, which refers to "beliefs in one's capabilities to execute the competencies needed to exercise control over events that affect one's welfare" (Bandura, 1986, p. 1), that is, the belief that one is able to perform a certain behavior. Kerr (1992) proposed that the self-efficacy of cooperation is positively and causally related to the rate or probability of cooperation in social dilemmas and called this proposition the "efficacy-cooperation hypothesis" (p. 60). This efficacy-cooperation hypothesis suggests that cooperation tends to decrease especially in large-scale social dilemmas because the individual's perception that one's cooperation will make a difference (self-efficacy of cooperation) decreases in a large group (Kerr, 1992).

We proposed that greater self-efficacy of cooperation will be associated with the tendency to take more concrete steps toward ameliorating the negative effects of global climate change.

OVERVIEW OF THE ANALYSES AND HYPOTHESES

The major goals of the study are twofold: First, we investigated whether and how the proposed predictors explain the three beliefs about global climate change. Second, we investigated whether those three beliefs about global climate change, which represent the perception of risk, predict the intention to act against global climate change. In predicting this intention, we also investigated the effect of self-efficacy.

A set of hypotheses that are discussed above are summarized below:

Hypothesis 1: Environmental apathy and the support for the free-market ideology will be negatively associated with the three beliefs of global climate change. More specifically, those who are environmentally apathetic and subscribe to the free-market ideology tend to believe that (a) global climate change is not occurring, (b) its causes are natural, and (c) its consequences are not all negative.

Hypothesis 2: Ecocentrism will be positively associated with the three beliefs about global climate change described above.

Hypothesis 3: Environmental apathy and the support for the free-market ideology will be negatively associated with the intention to act.

Hypothesis 4: In predicting the intention to act against global climate change, ecocentrism will predict the intention better than anthropocentrism.

Hypothesis 5: Self-efficacy will explain unique variance over and above the other variables in predicting behavioral intention.

Hypothesis 6: Based on O'Connor et al.'s (1999) results, we also hypothesized that knowledge about global climate change will be associated with the belief in global climate change and the intention to take ameliorative action.

METHOD

PARTICIPANTS AND PROCEDURES

Six hundred questionnaires were delivered to houses on randomly selected streets in a western Canadian city. Each questionnaire package included a preaddressed and prestamped return envelope. We requested any person in the household older than age 18 years to complete the questionnaire and mail it back. (See Appendix A for items.)

MATERIALS

Beliefs about global climate change. These were measured in terms of three conceptually different beliefs: (a) the belief that global climate change is occurring, (b) the beliefs about its possible causes, and (c) the beliefs of its possible consequences. The response format ranged from 1 (*strongly disagree* or *very unlikely*, depending on the wording of the question) to 5 (*strongly agree* or *very likely*) for all questions.

The belief that climate change is occurring was measured with a set of six items, including “How likely do you think it is that global climate change is occurring now?” Beliefs about the causes and consequences of global climate change were assessed with a set of four items each. Unlike previous studies, the questionnaire included items representing natural causes and positive consequences as well as human causes and negative consequences, to avoid predisposing participants toward any particular view of global climate change.

Behavioral intention. The intention to take action to address negative effects of global climate change was measured using four items. An example of the intention scale is “I intend to take concrete steps to do something to mitigate the negative effects of global climate change.”

Other variables. Perceived knowledge about the causes of global climate change was queried by asking the following question: “I would say my technical knowledge about global climate change is” minimal, limited, moderate, extensive, and professional, coded from 1 to 5. Support for free-market ideology¹ was measured with six items, such as “Free and unregulated markets pose important threats to sustainable development” (reversed item). Thompson and Barton’s (1994) scales were used in their original form to measure environmental attitudes. Examples of the original items for each orientation are “I can enjoy spending time in natural settings just for the sake of being out in nature” (ecocentric); “The most important reason for conservation is human survival” (anthropocentric); and “I don’t care about environmental problems” (environmental apathy). Self-efficacy of cooperation was measured using four items. An example of the self-efficacy scale is “There are simple things that I can do that will have a meaningful effect to alleviate the negative effects of global climate change.”

Demographic information, including age, gender, education, and income, was also sought.

RESULTS

DESCRIPTIVE STATISTICS

Demographics. Of the 600 questionnaires delivered, 190 were returned, a return rate of 31.6%. Five of the 190 were not completed and, thus, were excluded from the analysis, resulting in 185 completed questionnaires. Participants' ages ranged from 18 to 88 years, with average age of 51.4 (50.5% females, excluding 2 respondents who failed to report their gender). Reported income level ranged from CAN \$16,000 to \$175,000, with an average of \$68,000. About 73% answered that they had completed a university or college education.

Psychometric properties. The means, standard deviations, and Cronbach's alpha of the scales are presented in Table 1. Most scales achieved reasonable reliabilities, ranging from .74 to .92. For two scales (support for the free-market ideology and ecocentrism), a few items were dropped to improve reliability. The final number of the items used for each scale is also listed in Table 1.

Belief levels. The average level of beliefs that global climate change is occurring ($M = 3.94$), is mainly human caused ($M = 3.78$), and will have negative consequences ($M = 3.83$) was relatively high, as was the intention to engage in ameliorative actions ($M = 3.33$), all on 5-point scales. Nonetheless, not all respondents believed in global climate change. For example, 15.1% either disagreed or strongly disagreed with the item "I am quite sure that global warming is occurring now," and 14.1% either disagreed or strongly disagreed with the item "The main causes of global warming are human activities."

CORRELATIONS

Table 2 displays the correlations among the constructs. Most of the hypothesized associations were confirmed. Support for free-market ideology was negatively associated with ecocentrism, all three beliefs about global climate change, and behavioral intention. Environmental apathy was also negatively correlated with the three beliefs, behavioral intention, and self-efficacy, whereas ecocentrism was positively correlated with the same variables.²

TABLE 1
Descriptive Statistics

	M	SD	α	<i>Number of Items</i>
Belief in occurrence	3.94	.70	.87	6
Belief in human causes	3.78	.90	.92	4
Belief in negative consequences	3.83	.65	.82	4
Support for free market	2.26	.69	.75	13
Environmental apathy	1.76	.69	.84	7
Ecocentrism	4.45	.58	.83	5
Anthropocentrism	3.55	.55	.74	9
Perceived knowledge	2.56	.90		1
Intention to act	3.33	.38	.89	4
Self-efficacy	3.23	.77	.80	5
Age	51.40	18.81		
Gender	.51	.50		
Income	68.31	33.75		
Education	3.65	1.04		

NOTE: Internal consistency (alpha) and number of the items for the construct are given for composite variables. Income is given units of CAN \$1,000. Larger values for education indicate higher education (1 = elementary school, 2 = high school, 3 = some college, 4 = bachelor degree, and 5 = post-graduate education).

Perceived knowledge was positively associated with two of the three beliefs about global climate change and negatively correlated with anthropocentrism and environmental apathy, whereas it was not significantly correlated with ecocentrism or behavioral intention.

Among demographic variables, only age and gender were significantly associated with other variables. For example, older people tended to believe that the causes of global climate change are natural, that the consequences are not all negative, and were more apathetic about environmental issues. Gender was significantly associated only with self-efficacy. Females tended to report more self-efficacy than males.

PREDICTING BELIEFS ABOUT CLIMATE CHANGE

Next, regression analyses were performed for each of the three beliefs about global climate change. The results of these analyses are summarized in Table 3.

The following variables were entered to predict these beliefs: (a) age as a covariate, (b) perceived knowledge about global climate change, (c) support

TABLE 2
Correlations Among Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age														
2. Gender	-.19*													
3. Education	-.08	-.11												
4. Income	-.04	-.09	.28*											
5. Perceived knowledge	-.12	-.12	.15	.12										
6. Support for free market	.09	.05	-.17	.14	-.15									
7. Ecocentrism	-.17	.17	-.10	-.15	.07	-.48*								
8. Anthropocentrism	.19	-.05	-.14	-.16	-.19*	-.11	.27*							
9. Environmental apathy	.22*	-.13	.02	.11	-.20*	.55*	-.60*	-.16						
10. GCC occurring	-.07	.04	-.01	-.14	.24*	-.38*	.53*	.25*	-.53*					
11. Human causes	-.26*	.07	.07	-.07	.17	-.43*	.44*	.06	-.62*	.51*				
12. Negative consequences	-.25*	.10	-.02	-.03	.25*	-.40*	.41*	.01	-.58*	.49*	.63*			
13. Self-efficacy	-.04	.28*	-.05	-.03	.16	-.26*	.34*	.09	-.41*	.41*	.32*	.23*		
14. Intention	-.17	.17	-.03	-.01	.18	-.45*	.50*	.06	-.55*	.52*	.45*	.37*	.65*	

NOTE: GCC: global climate change.

* $p < .01$.

TABLE 3
Regression Analyses for Three Beliefs About Global Climate Change

	<i>Belief That Global Climate Change Is Occurring</i>	<i>Human-Made Causes</i>	<i>Negative Consequences</i>
Age	.05	-.13	-.11
Perceived knowledge	.16*	.03	.16*
Support for free market	-.07	-.13	-.10
Anthropocentrism	.12	-.02	.09
Ecocentrism	.30**	.06	.07
Environmental apathy	-.26**	-.47**	-.42**
R^2	.40 (.38)**	.41(.39)**	.39 (.37)**

NOTE: Only betas are shown. Values in the parentheses are adjusted R^2 .
 * $p < .05$. ** $p < .01$.

for free-market ideology, and (e) the three environmental attitudes: ecocentrism, anthropocentrism, and environmental apathy.

Is global climate change occurring? Collectively, the six predictors explained 40% of the variance in lay beliefs about whether climate change is a real phenomenon, $F(6, 162) = 17.86, p < .001$. The significant predictors were ecocentrism ($\beta = .30, p < .01$), environmental apathy ($\beta = -.26, p < .01$), and perceived knowledge ($\beta = .16, p < .05$). Greater ecocentrism, more perceived knowledge, and less apathy predicted stronger beliefs that the phenomenon was real.

The causes of global climate change. Among the six predictors of beliefs about the perceived causes of global climate change, only environmental apathy was significant; however, it was strongly so, accounting for 41% of the variance, $\beta = -.47, p < .01, F(6, 165) = 19.16, p < .001$. Greater apathy predicted the belief that global climate change was not human caused.

Negative consequences. In predicting whether the outcomes of climate change will be positive or negative, environmental apathy again was the strongest predictor ($\beta = -.42, p < .01$), followed by perceived knowledge ($\beta = .16, p < .05$), for a total of 39% of variance explained, $F(6, 167) = 17.72, p < .001$. Less apathy and more perceived knowledge predicted the belief that the consequences would be more negative.

MEDIATION: A POST HOC ANALYSIS

Although the zero-order correlations between the beliefs about global climate change and support for free-market ideology were as hypothesized, when all the predictors were entered in the regression simultaneously, support for free-market ideology was no longer a significant predictor of any global climate change beliefs. From the nature of the zero-order correlations and the results of the regression analyses, we suspected a mediated relationship involving support for free-market ideology and environmental apathy. Thus, we performed mediation analysis (Baron & Kenny, 1986) to investigate the underlying relationships.

The results of these analyses (Table 4) revealed that the effect of support for free-market ideology on each of the three beliefs was mediated by environmental apathy. This result may be interpreted as follows: Those who subscribe to the free-market ideology tend to be optimistic that an uninterrupted free-market system will lead to beneficial outcomes for all, which leads to apathetic, unconcerned attitudes toward environmental problems. These apathetic attitudes, in turn, influence beliefs about global climate change, in the direction that global climate change is not occurring, humans are not responsible for it, and its consequences will not be negative.

PREDICTING THE INTENTION TO ACT

Finally, we investigated whether these beliefs about global climate change contribute to the prediction of the willingness to act against global climate change. We used a two-step hierarchical multiple regression to examine whether self-efficacy would add unique variance over and above the other variables.

Table 5 summarizes the result of each step. In the first step, covariates (age and gender), support for free-market ideology, attitudinal variables (e.g., ecocentrism), and the three beliefs were entered. This model explained a substantial amount of the variance in intention, $R^2 = 40.5$, $F(10, 154) = 10.49$, $p < .001$. When self-efficacy was added in the second step, it explained a large additional amount of variance; the R^2 change was $.16$, $F(1, 153) = 55.46$, $p < .001$. The final model with 11 predictors explained 56.4% of the variance in the willingness to act, $F(11, 153) = 17.962$, $p < .001$.

In the final model, the significant predictors were the following: support for the free-market ideology ($\beta = -.13$, $p < .05$), ecocentrism ($\beta = .19$, $p < .05$), belief that global climate change is occurring ($\beta = .15$, $p < .05$), and self-efficacy ($\beta = .47$, $p < .001$).

TABLE 4
Mediation Analyses

IV	DV			DV			DV		
	Apathy	Occurrence	Consequence	Apathy	Cause	Consequence	Apathy	Cause	Consequence
Free market	-.32***	-.15*	-.07	-.32***	-.28***	-.13	-.32***	-.23**	-.10
Apathy			-.27***			-.47***			-.42***

NOTE: IV = independent variable; DV = dependent variable. Only betas are shown. This mediation analysis is to investigate the flow of influence: Support for free-market ideology → Environmental apathy → Each specific belief about global climate change. For each belief (occurrence, cause, consequence), the following set of three regressions was performed: (a) regress apathy on support for free-market ideology (abbreviated as free market in the table); (b) regress belief on free market; and (c) regress belief on free market and apathy.
*** $p < .001$.

TABLE 5
Regression Analysis for Behavioral Intention

<i>Steps</i>	<i>1</i>	<i>2</i>
Age	-.05	-.07
Gender	.08	-.05
Perceived knowledge	.01	-.04
Support for the free-market ideology	-.15*	-.13*
Environmental attitude orientations		
Ecocentrism	.16	.19*
Anthropocentrism	-.08	-.08
Environmental apathy	-.16	-.06
Beliefs about global climate change		
Global climate change is occurring	.27**	.15*
Causes are man-made	.12	.08
Consequences are negative	-.08	-.03
Self-efficacy		.47**
R^2	.41 (.37)**	.56 (.53)**
R^2 change		.16**

NOTE: Only betas are shown. Values in the parentheses are adjusted R^2 .
 * $p < .05$. ** $p < .01$.

DISCUSSION

The current study investigated the bases of lay beliefs about global climate change. Regression analyses explained considerable variance in lay beliefs about global climate change (approximately 40% for all three beliefs) and the intention to take ameliorative actions (57%). Support for free-market ideology indirectly influences disbelief in global climate change, by fostering environmental apathy. Because relatively few studies have investigated a limited number of factors associated with risk perception of or beliefs about global climate change, these results further the understanding of laypersons' beliefs about global climate change. The specific findings are elaborated next.

ENVIRONMENTAL ATTITUDES

Rather than employing a unidimensional approach to environmental attitudes, the current study used a multidimensional measure: Thompson and Barton's (1994) ecocentric, anthropocentric, and environmental apathy constructs. This proved to be useful because the different dimensions of environmental attitudes influenced beliefs differently. For example, anthropocentrism and ecocentrism had different patterns of correlation with other

variables, as hypothesized. Ecocentrism was positively correlated with beliefs about causes and consequences, behavioral intention, and self-efficacy and negatively correlated with support for the free-market ideology and environmental apathy, whereas anthropocentrism was not significantly correlated with any of these variables.

The third construct in Thompson and Barton's (1994) scale, environmental apathy, was most strongly (negatively) correlated with beliefs about the causes and consequences of global climate change, and the intention to act. As seen in the regression analyses of the beliefs, the effect of environmental apathy overpowers that of other predictors, including support for free-market ideology and ecocentric orientation. Although this construct has been often neglected when researchers use Thompson and Barton's scales with the focus on eco- versus anthropo-centrism dimension, our results suggest that environmental apathy may be the most fruitful predictor of global climate change beliefs and related behavioral intentions.

One explanation for this may be related to the characteristics of global climate change: its uncertainty and the gradual, long-term manifestation of its possible negative effects. A similar outcome was reported for the risk perception of radon gas by the general public (Golding, Krinsky, & Plough, 1992). The authors pointed out "the predominance of public apathy" toward the risks of radon gas: "To many, radon was just another worry on an already long and bemusing list of environmental concerns" (p. 32). When the negative effect of certain environmental hazards is not clearly or immediately apparent, individuals may tend to "put it to the back burner" and attend to more relevant, salient worries in their everyday lives. Kuhn (2000) also pointed out that when the risks from a certain environmental hazard are uncertain, many people use the uncertainty to justify their discounting of the seriousness of any possible threat: "In fact, environmentalists have often argued that uncertainty about the extent or likelihood of environmental degradation is wrongly used as an excuse for complacency or the delay in rectifying ecological hazards" (p. 43).

PERCEIVED KNOWLEDGE ABOUT GLOBAL CLIMATE CHANGE

Perceived knowledge about global climate change was a significant predictor for two of the three beliefs about global climate change (i.e., that it is occurring, and that its consequences are negative). However, in the current study, it was not a significant predictor of behavioral intention, nor was it significantly associated with the behavioral intention at zero order. This suggests that the intention to take ameliorative action does not necessarily arise from greater perceived knowledge about global climate change. Rather,

one's value orientations, such as ecocentrism, support for free-market ideology, and the belief in self-efficacy of cooperation, may be more important factors that promote the intention.

It is also interesting that perceived level of knowledge about global climate change had almost zero correlation with ecocentrism. This implies that having an ecocentric orientation and believing that one is knowledgeable about environmental issues are relatively independent. Further study is needed to confirm these points.

THE INTENTION TO ACT

Self-efficacy explained most of the variance in behavioral intention, followed by ecocentrism, and support for the free-market system. The importance of self-efficacy in behavioral intention found in the current study corroborates previous studies' findings (e.g., Geller, 1995).

This finding has important, if understandable, implications for understanding behavioral intention in this area. It appears that before individuals are ready to act against climate change, they must believe that even a small thing one individual can do will make a meaningful difference. For example, a number of successful letter-writing campaigns to protect the environment have been reported (e.g., see Web site: www.globalresponse.org/camphist.php). Thus, it will be fruitful to promote the sense of self-efficacy.

Second, the results of the regression analyses suggest that belief that global climate change is actually occurring is an important prerequisite to be willing to take action. This result corroborates the argument advanced by O'Connor et al. (1999), that "risk perceptions matter in predicting behavioral intentions. Risk perceptions are not a surrogate for general environmental beliefs, but have their own power to account for behavioral intentions" (p. 469). Our findings underscore this point.

SUPPORT FOR FREE-MARKET IDEOLOGY

Free-market ideology has been pointed out as a culprit of various forms of environmental degradation (e.g., Gladwin et al., 1997). However, the current study is the first to our knowledge to empirically demonstrate the association between the construct and the perception of environmental problems. With respect to beliefs about global climate change, results from a correlational analysis indicate that those who value the free market system over environmental quality tend to believe that global climate change is not occurring, that the causes of global climate change are more natural than human caused, and

that its consequences will not be negative. It was also a significant predictor of not taking action to address the negative effects of global climate change.

These results support the suggestion by Stern and Dietz (1994) that

values can influence beliefs about environmental conditions by acting as an active filter for information. Individuals who hold strong traditional or . . . materialistic values, which environmentalists often claim will need to be sacrificed to preserve the environment, tend to deny that human activities are harmful to nature. (p. 76)

These findings also lend support to the existence of egocentric bias in beliefs about the causes and consequences of climate change. As noted earlier, the same scientific facts may be interpreted in very different ways according to one's interest. For those who support a free-market system, it appears to be more convenient and self-serving to believe that climate change is a natural phenomenon and that its consequences will not be negative. An example of this situation may be seen in the recent unwillingness to ratify the Kyoto Protocol by the United States, with its heavy reliance on the use of fossil fuels.

This finding has important implications for intervention programs designed to educate people with the putative causes (human-made) of global climate change. O'Connor et al. (1999) hypothesized that presenting information about the causes of climate change will foster the behavioral intention to act on those causes. However, our results suggest that merely presenting the causes of the problem probably will not be sufficient because individuals are likely to interpret the same information in different ways, to serve their own interests and preconceptions. This variation in interpretation of information may be more pronounced in case of uncertainty, such as global climate change.

Our study finding also suggests a new relationship that has not been discussed in previous literature: the mediated relationship between support for free-market ideology, environmental apathy, and beliefs about global climate change. The effect of support for free-market ideology on the beliefs appears to be indirect, mediated by apathetic orientation toward the environment. This finding corroborates Bjerke and Kaltenborn's (1999) results, in which environmental attitudes as expressed on Thompson and Barton's (1994) scales mediated between general values and more specific attitudes or beliefs toward large carnivores. This relationship makes sense from the cognitive hierarchy perspective (Homer & Kahle, 1988; Vaske, Donnelly, Williams, & Joker, 2001), which postulates the flow of influence from the most abstract values, to general attitudes, to beliefs about more specific objects and

situations, to behavioral intentions. Support for free-market ideology, as a value that an individual holds, brings about optimistic and apathetic attitudes toward the environment, and this attitude, in turn, influences the individual's specific beliefs about global climate change.

Having said that, it is of note that support for free-market ideology directly influenced behavioral intention to ameliorate the effect of global climate change, whereas environmental apathy did not. One way to understand this result is that beliefs about global climate change and behavioral intention are different constructs in nature. For example, it takes a sense of self-efficacy to be willing to take actions but believing whether global climate change is occurring. It can be that such beliefs are more influenced by apathetic orientation toward the environment than behavioral intention is. And these beliefs, in turn, influence the willingness to take actions directly. Nonetheless, further studies are required to establish more firmly this mediation relationship between support for free-market ideology, environmental apathy, and specific beliefs.

As a last comment, we believe that trust in the free-market economy system itself is not necessarily harmful; it is important for stimulating economic prosperity. Especially in the developed world, it is deeply embedded in the fundamental values about how the world should operate. What may require correction is the seemingly widespread assumption that economic development and environmental protection often conflict. It is sometimes forgotten that many (although not all) environmental problems can be addressed through technological innovation. A good example may be the hydrogen fuel cell as a replacement for conventional oil-consuming engines. However, unless the commonly held assumption that environmental protection often leads to a lower standard of living (e.g., job loss, inconvenient lifestyle, or limitation of personal freedom) is dispelled, individuals may not be willing to take action to protect the environment. For example, O'Connor and his colleagues (O'Connor, Bord, Yarnal, & Wiefek, 2002) found that *ego-environmentalism* (the belief that environmental protection efforts do not threaten jobs, limit personal freedom, or hurt the economy), but not income, strongly predicted support for actions that require a cash outlay for reducing greenhouse gas emissions.

Especially for those who do not endorse protecting the environment strongly, public education may be more fruitful if it can raise awareness that economic prosperity and environmental protection are not always in conflict. As Kaplan (2000) pointed out in offering his reasonable person model, we should try to generate "multiply desirable choices" (p. 500) that are sustainable and satisfying for our pursuit of economic prosperity through free-market ideology.

CONCLUSION

The current study sheds light on the psychological mechanisms related to lay beliefs and intentions associated with global climate change. If climate change is indeed occurring, importantly caused by human actions, and will have negative consequences, then these results will help point the way toward changing behavior. Takala (1991) stated that the first necessary step to tackle the problems of global climate change is to systematically describe how people perceive environmental problems and how they become aware of risks. The current study is one step toward this endeavor.

APPENDIX A Items Used in the Questionnaire

Perception that global climate change is occurring:

1. How likely do you think it is that global warming is occurring now?
very unlikely unlikely unsure likely very likely
2. I have already noticed some signs of global warming.
strongly disagree disagree unsure agree strongly agree
3. It seems to me that temperature is warmer now than in years before.
Strongly disagree disagree unsure agree strongly agree
4. It seems to me that weather patterns have changed compared to when I was a child.
strongly disagree disagree unsure agree strongly agree
5. I am quite sure that global warming is occurring now.
strongly disagree disagree unsure agree strongly agree
6. The following is an actual newspaper article reported last year:

North Pole free of ice for first time in 50 million years.
The North Pole is melting. The thick ice that has for ages covered the Arctic Ocean at the pole has turned to water, recent visitors there reported this weekend. At least for the time being, an ice-free patch of ocean about 1½ kilometers wide has opened at the very top of the world, something that has never before been seen by human beings and is more evidence that global warming may be real and already affecting climate.

When you read this article, what is the statement that most closely represents your response to this article?

It is an obvious sign that global warming is actually occurring.
I think probably this indicates that global warming is occurring.
I am unsure what to make of it.
I am still not that convinced that global warming is occurring.
This article is an exaggeration; it does not prove at all that global warming is occurring.

Perception of causes:

(The response format for all of the items below is the same: strongly agree to strongly disagree.)

1. Global warming is mainly due to natural causes, not human activity.
2. The main causes of global warming are human activities.
3. Global warming is merely a natural fluctuation, not caused by human activity.
4. I am quite sure that human activities are to be blamed for global warming.

Perception of consequences:

1. Unlike what most scientists say, there will be some positive consequences of global warming for the environment.
2. The consequences of global warming will be harmful for the environment.
3. Global warming will bring about some serious negative consequences.
4. The consequences of global warming will be more positive than negative overall.

Self-efficacy:

1. There are simple things that I can do that will have a meaningful effect to alleviate the negative effects of global warming.
2. I believe that little things I can do will make a difference to alleviate the negative effects of global warming.
3. Even if I try to do something about global warming, I doubt if it will make any difference.
4. There is very little I can do to mitigate the negative effect of global warming.

Intention to act:

1. I plan to take some actions to stop global warming.
2. I personally do not intend to do much to stop global warming.
3. I will make some efforts to mitigate the negative effects of global warming.
4. I intend to take concrete steps to do something to mitigate the negative effects of global warming.

Support for the free-market system:

1. An economic system based on free markets unrestrained by government interference automatically works best to meet human needs.
2. I support the free-market system, but not at the expense of environmental quality.
3. The free-market system may be efficient for resource allocation, but it is limited in its capacity to promote social justice.
4. The preservation of the free market system is more important than localized environmental concerns.
5. Free and unregulated markets pose important threats to sustainable development.
6. The free-market system is likely to promote unsustainable consumption.

APPENDIX B
Principal Component Analyses of the Items

	<i>Three Belief Measures</i>		
	<i>Components</i>		
	1	2	3
Perception3	.81		
Perception2	.81		
Perception4	.78		
Perception5	.72		
Perception6	.62		
Perception1	.59	.40	
Cause2		.84	
Cause3		.84	
Cause1		.84	
Cause4		.83	
Consequence2			.80
Consequence1			.72
Consequence3		.42	.68
Consequence4			.65
Variance explained (%)	25.6	25.6	18.1
Total variance (%)	69.3		

NOTE: Items are listed in Appendix A.

NOTES

1. This construct is aimed at measuring the priority placed on an unrestrained free-market system versus one of sustaining environmental quality. It is called "support for the free-market ideology" hereafter for the sake of brevity.

2. Because some of the constructs (three beliefs about global climate change; the behavioral intention; and self-efficacy) had relatively high correlations with each other, a principal components analysis of the items with varimax rotation was performed to examine whether these items form separate constructs, as they were intended to. The results show that in general, items for each construct created separate factors as shown in Appendix B, thus demonstrating reasonable discriminant and convergent validities of the constructs.

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