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CULTURAL THEORY AND INDIVIDUAL PERCEPTIONS OF ENVIRONMENTAL RISKS

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ABSTRACT: Understanding differences in environmental risk perception and risk judgments might facilitate the development of effective environmental risk management strategies, including risk communication. Cultural theory holds that systematic individual differences exist in the perception of environmental risks based on four different myths of nature: nature benign, nature ephemeral, nature perverse/tolerant, and nature capricious. The myths of nature represent distinct perceptions toward environmental risks, which are assumed to be closely related to preferences for appropriate risk management strategies. The authors examined to what extent myths of nature are related to beliefs associated with problems of car use and preferences for strategies to manage these problems. As hypothesized, significant variations in perceptions, preferences, and policy evaluations were found among respondents favoring different myths of nature. Nature ephemeral was associated with a higher problem awareness

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and a more positive evaluation of policy measures, especially in comparison to nature benign.

One does not know all the risks one faces. The nature, the seriousness, and the consequences of most environmental problems—for example, the greenhouse effect and acid rain—are uncertain. Moreover, there is a lot of discussion in the scientific community regarding the seriousness of environmental problems, the need for managing these risks, and the (type of) measures that should be taken (Roe, 1996). No one knows what will happen if these environmental problems are neglected, and no one always knows how to solve or to prevent these problems. As a consequence, environmental policy as well as the perceived acceptability of this policy is to a large extent based on risk perceptions and risk judgments of various groups of experts and laypersons. Understanding differences in risk perception and risk judgments might facilitate the design of effective environmental risk management strategies.

Different groups in society may evaluate environmental risks differently. Attempts to explain environmental concerns in terms of standard demographic variables have generally not fared well (Jones & Dunlap, 1992). Cultural theory implies that risks are socially constructed; namely, people choose what to fear and how to fear it to sustain their preferred pattern of social relations (Douglas & Wildavsky, 1982). In essence, cultural theory accounts for the social construction of risk in terms of three interlinked domains: (a) the form of social relationships people maintain; (b) cultural biases such as shared values and beliefs including views on human nature, views on society, risk perceptions, and so-called myths of nature, which especially refer to biases toward environmental risks; and (c) preferred behavioral strategies (see Douglas & Wildavsky, 1982; Schwarz & Thompson, 1990; and Thompson, Ellis, & Wildavsky, 1990, for a comprehensive overview of cultural theory). The three domains constitute four systematic different ways of life: fatalists, hierarchists, individualists, and egalitarians.¹ It is assumed that social relations generate values, beliefs, perceptions, and policy preferences that in turn sustain those relations. Cultural theory implies that people can be classified in four groups (i.e., the four ways of life) based on their views and values. These worldviews and value systems are supposed to

Environment. This article was greatly improved by helpful comments from Birgitta Gatersleben, Charles Vlek, and two anonymous reviewers on earlier drafts of this manuscript. Please address correspondence to Linda Steg, Social and Cultural Planning Office, Postbox 16164, 2500 BD Den Haag, the Netherlands; phone: +31 70 3407415; fax: +31 70 3407044; e-mail: LS@SCP.NL.

influence risk perceptions, risk judgments, and preferences for risk management strategies.

Cultural theory originates from anthropology and is typically based on anthropological research (with groups or societies being the unit of analysis) and on theoretical reasoning. The few empirical studies that have been aimed at testing cultural theory on an individual level focused on the relation between cultural biases and risk perception and environmental concerns. These studies reveal that the cultural biases of individualists, hierarchists, and egalitarians do indeed each engender a different ranking of possible dangers. Technological and environmental dangers appear to be most worrisome for egalitarians, threats to authority is most feared by hierarchists, and certain kinds of market failures evoke the most concern for individualists (Dake, 1991; Wildavsky & Dake, 1990). However, the cultural biases explain very little variance (only 5%) in the risk ratings of these various hazards (Sjöberg, 1996).² Another study showed that egalitarians are generally suspicious of technologies and they view technological risks in terms of harms, whereas individualists have a tendency to see benefits of most of these risks. Hierarchists appear to be comfortable with determining acceptable risks levels for technologies; they explicitly weigh harms and benefits associated with these risks (Palmer, 1996).

Cultural biases are correlated with environmental consciousness and environmental concern. Egalitarianism is positively correlated with environmentalism, whereas individualism is negatively correlated with environmentalism (Ellis & Thompson, 1997; Grendstad & Selle, 1997).³ The correlation between hierarchy and environmentalism is not univocal. Ellis and Thompson (1997) reported that hierarchy is only very weakly correlated with environmentalism, whereas Grendstad and Selle (1997) reported moderate negative correlations between hierarchy and environmentalism. Contrary to the assumption drawn from cultural theory, different cultural biases such as views on society and myths of nature appear not to be significantly correlated (Grendstad, Selle, & Strømsnes, 1997). This may partly be due to the measurement scales used. However, these findings may raise the question whether cultural biases toward different domains are indeed related consistently. For example, one might well be an individualist in one subdomain but a hierarchist in another subdomain (see also Rayner, 1992).

From this, two important conclusions can be derived. First, whereas the relation between social relations, cultural biases, and preferences for behavioral strategies is central to cultural theory, to the authors' knowledge, no empirical evidence is available on the relations between these three domains on an individual level. Second, preferences for risk management strategies might be dependent on the type of risk that has to be controlled; namely,

egalitarians might call for interventions to control technological and environmental dangers but might not demand interventions aimed at reducing threats to authority. Moreover, it is as yet not clear whether people are indeed consistent in their cultural biases as explained earlier. Therefore, the relation between the three main concepts might be better studied within one subdomain. This study is aimed at examining the relations between cultural biases and preferences for behavioral strategies with regard to environmental risks. It will focus on the myths of nature, which are especially relevant for research on environmentally relevant behavior for they refer to biases toward environmental risks as well as to perceived solutions to manage these risks. Next, the myths of nature will be described. Then, the authors will examine to what extent myths of nature are indeed coherent systems of environmental beliefs and preferences for management strategies by examining differences between respondents subscribing to different myths of nature in environmental risk perception, in preferences for appropriate risk management strategies, and in environmental risk-taking behavior. The authors will focus on environmental problems related to car use.

MYTHS OF NATURE

The perception of environmental risks can be categorized in correspondence with four so-called myths of nature: nature capricious (fatalist), nature perverse/tolerant (hierarchical), nature benign (individualist), and nature ephemeral (egalitarian).⁴ The myths of nature can be symbolized by a ball in a landscape (see Figure 1). The landscape symbolizes the vulnerability of nature; the ball symbolizes environment-risky behavior. Within each landscape, the ball is in equilibrium.

In contrast to more common theories and models dealing with environmental concerns, cultural theory explicitly links risk perception to perceived solutions to reduce these risks; for example, individualists might perceive environmental risks as less threatening than egalitarians do because individualists might believe new solutions will arise, whereas egalitarians might believe the risks are irreversible. The myths of nature are also based on theoretical reasoning and include views on nature, views on resources, views on how to make ends meet, environmental risk perception, and preferences for strategies to manage environmental risks (Dake, 1991, 1992; Douglas & Wildavsky, 1982; Schwarz & Thompson, 1990) (see Figure 1).

Nature benign, the individualists' myth of nature, conveys a robust and resilient system: The ball will always find its way back to the bottom of the basin (see Figure 1). Nature is seen as a stable and global equilibrium, and resources are expected to be abundant. This is associated with the belief that

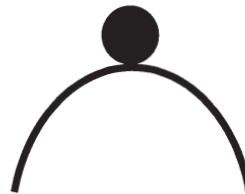


Nature Capricious (Fatalist)

- * View on nature: none
- * View on resources: lottery
- * Needs nor resources controllable
- * Environmental risk perception: what you don't know cannot harm you
- * Management strategy: cope

Nature Perverse/Tolerant (Hierarchist)

- * View on nature: unstable equilibrium
- * View on resources: scarce
- * Needs are not, but resources are controllable
- * Environmental risk perception: acceptable risks, determined by experts
- * Management strategy: regulation and control



Nature Benign (Individualist)

- * View on nature: stable/global equilibrium
- * View on resources: abundant

Nature Ephemeral (Egalitarian)

- * View on nature: precarious balance
- * View on resources: depleting

Figure 1: Myths of Nature

resources as well as needs are controllable. Environmental risks are seen as opportunities; individualists think new technological solutions will arise. Therefore, they are less bothered by environmental problems, and they do not feel coresponsible for the problems and their solutions by changing their behavior. People adhering to this view (individualists) are supposed to be risk

seeking (concerning the environment). Nature benign legitimizes individualistic social relations. Individualists tend to create social sanctions that defend their freedom to bid and to bargain in self-regulated networks with few prescriptions. They are opposed to collective control. Therefore, their rational risk management strategy is the market system (as opposed to government regulation); they strongly believe in market forces and in equal opportunity for all.

Nature perverse or tolerant, the hierarchists' myth of nature, conveys a robust system but only up to a point: It will take as much—but only as much—damage as the experts and authorities say. The ball will find its way to the bottom of the basin but only as long as people respect the limits set by experts (see Figure 1). Nature is seen as an unstable equilibrium with resources being scarce. Risks are accepted as long as the experts say so; it is a matter of accepting acceptable risks. Hierarchists believe environmental problems can be controlled by government regulations based on experts' knowledge on the limits of growth. Nature perverse or tolerant legitimizes hierarchical social relations. The rational risk management strategy is sustainable growth; for example, a policy that takes advantage of the perceived resilience of nature but respects the known limits (Brundtland, 1989). This policy is aimed at controlling the resources because hierarchists believe that needs cannot be controlled. The hierarchical myth of nature justifies having regulations and prescriptions flow down (because only experts know the limits of growth), whereas compliance to regulations is supposed to flow up.

Nature ephemeral, the egalitarian myth of nature, represents a precarious and delicate balance; the least jolt may lead to disastrous consequences (see Figure 1). They view nature as a limited equilibrium, and natural resources are supposed to be depleting. They think resources are not controllable, unlike needs. Nature ephemeral is associated with risk aversion as far as these risks are seen as hidden, irreversible, and inequitable. People adhering to this myth of nature are very concerned with environmental problems and think they could and should contribute to the solution of environmental problems by reducing their needs. Nature ephemeral legitimizes egalitarian social relations. Egalitarians claim that nature is fragile to justify equal sharing of what they see as the one finite Earth. Egalitarians prefer risk management strategies that foster equality of outcomes for present as well as future generations. Because resources are supposed to be depleting (and not controllable), the only solution is to control one's needs. Therefore, they call for radical changes in behavior and society.

The fatalists' myth of nature, nature capricious, represents nature as an unmanageable and inefficacious system: You do not know in which direction the ball will roll or what the consequences will be (see Figure 1). Nature as

well as the quantity of resources is seen as unpredictable; neither needs nor resources are supposed to be controllable. Risk perception is based on the belief that what you don't know cannot harm you. Because all events are supposed to happen by chance, learning and managing is impossible. So, you just have to cope with erratic events. Nature capricious justifies fatalistic social relations. Fatalists view life as a lottery. Therefore, their rational risk management strategy is "Why bother?" This attitude rationalizes isolation and resignation to stringent control on their behavior. Fatalists do not differ systematically and consistently from the other myths of nature because they are not consistent in their thinking and acting; the fatalist is just coping.

Myths of nature refer to general beliefs toward environmental issues. General beliefs influence specific beliefs, attitudes, and norms, but they are not directly related to behavior (Stern, Dietz, & Guagnano, 1995). People can handle situations in contradiction of their myth of nature because this relation is mediated by other factors such as the situational constraints (Dietz, Stern, & Guagnano, 1998).

Myths of nature have been applied to explain differences in environmental risk perception, risk judgments, and preferences for risk management strategies on a societal level (Roe, 1996; Schwarz & Thompson, 1990; Thompson et al., 1990; Van Asselt, Beusen, & Hilderink, 1996). These studies were largely based on theoretical and logical reasoning and were not particularly aimed at gaining empirical evidence for the propositions that were made.

AIM AND HYPOTHESES

The aim of the study was to examine the relation between myths of nature and environmental beliefs, preferences for environmental risk management strategies, and environmental risk-taking behavior. Because management strategies are always tuned toward a particular environmental problem, the authors focused on a specific environmentally relevant behavior, namely car use. In line with cultural theory and the myths of nature explained earlier, the following hypotheses were tested (Ellis & Thompson, 1997; Thompson et al., 1990) (see Figure 1):

Hypothesis 1: Nature ephemeral is associated with a higher awareness of the problems of car use, feeling more responsible for these problems and their solutions, and evaluating policy measures aimed at reducing car use as more necessary, acceptable, and effective, especially in comparison to the nature benign view. The nature perverse/tolerant view takes a middle position.

Hypothesis 2: The nature capricious view does not differ systematically from the other myths of nature because people adhering to this view are not consistent in their thinking.

So, it was predicted that the relation between myths of nature and environmental risk perception and risk judgment is unidimensional with nature benign on the one side of the dimension, nature perverse/tolerant in the middle, nature ephemeral on the other side of the dimension, and the position of nature capricious on this dimension varying.⁵

METHOD

RESPONDENTS

A computerized questionnaire was sent to 413 respondents of the Dutch NIPO-Telepanel, which is a representative sample of the Dutch population, in September 1996. Respondents received the questionnaire through a modem on a personal computer, which was given on loan to each member of the panel. The answers were returned via modem. Respondents were 18 years or older.

All respondents were presented with questions about their myth of nature, their problem awareness, and their evaluation of car use policy measures (see next). The other questions (addressing environmental beliefs) were only answered by respondents who had regularly driven a car themselves in the year preceding the interview ($N = 269$) because these questions were only relevant to car users.

MEASURES

Myths of nature were measured by asking people to indicate which one of the following statements (see Table 1) corresponded most with their view on nature.⁶ This measure included views on nature (i.e., environmental concern) and preferred environmental risk management strategy (i.e., desired government approach) (see, for example, Schwarz & Thompson, 1990). Table 1 also gives the percentages of respondents and the percentage of car users that preferred a specific statement; as said before, some questions were only answered by car users. In the Netherlands, most people subscribed to nature ephemeral, whereas only few respondents (9%) subscribed to nature benign.

TABLE 1
Myths of Nature (%); All Respondents and Car Users, Respectively

	<i>Total</i> (N = 413)	<i>Car Users</i> (N = 269)
The environmental problems can only be controlled by enforcing radical changes in human behavior and in society as a whole (nature ephemeral).	47%	42%
The environmental problems are not running out of control, but the government should dictate clear rules about what is and what is not allowed (nature perverse/tolerant).	26%	32%
We do not need to worry about environmental problems because in the end, these problems will always be resolved by technological solutions (nature benign).	9%	9%
We do not know whether environmental problems will aggravate or not (nature capricious).	18%	18%

Car use was measured by asking respondents how many kilometers they normally travel by car (as a driver) annually ($M = 9,913$ kms). Moreover, respondents reported to what extent they used their car in comparison to other modes of transport. Scores could vary from 1 (*always use a car*) to 7 (*never use a car*) ($M = 2.8$).

Environmental beliefs. Table 2 gives an overview of the environmental beliefs that were measured. The items referred to the personal (dis)advantages of car use, awareness of the problems of car use, their own contribution to these problems and their solutions,⁷ and to the personal norm (Schwartz, 1977; E. M. Steg, 1996; Stern, Dietz, & Kalof, 1993). All items were rated on a 5-point scale. Some of the items were recoded as to make the scores vary from 1 (*low awareness*) to 5 (*high awareness*). A factor analysis was conducted to detect subsets of environmental beliefs. Oblique rotation (oblimin) was preferred because the belief clusters were likely to be correlated. Four factors had eigenvalues superior to 1. However, a three-factor solution was chosen because this solution revealed fewer cross-loadings. Together, the three factors accounted for 54% of the variance observed in the data. All factors loaded significantly on one factor ($r > .55$), and only one cross-loading was observed. Moreover, the internal consistency of the factors was acceptable ($.60 < \alpha < .79$). The results are presented in Table 2.

The first factor explained 33.9% of the variance and referred to the awareness of the problems of car use and the extent that this awareness had resulted in a less favorable attitude toward car use and in a personal norm to contribute

TABLE 2
Factor Analysis of Environmental Beliefs

	<i>Problem Awareness</i> ($\alpha = .79$)	<i>Efforts Useful</i> ($\alpha = .62$)	<i>Responsibility</i> ($\alpha = .60$)
Car use is a societal problem.	0.74		
Problems of car use are uncertain. ^a	0.73		
Car use is especially disadvantageous for society.	0.71		
I feel guilty when using my car frequently.	0.64		
Environmental problems of car use are trivial compared to other polluters. ^a	0.61	0.57 ^b	
Car use is especially disadvantageous for myself.	0.59		
Problems of car use cannot be solved, we just have to cope. ^a		0.76	
No use to worry about problems, for new solutions will arise. ^a		0.71	
No use to reduce my car use, others will keep on driving. ^a		0.69	
I personally contribute to the problems by driving my car.			0.76
My own car use is a problem for society.			0.71
I can contribute to solutions by driving less.			0.60
Car use causes major problems, but I cannot do anything about it. ^a			0.58

NOTE: Only factor loadings > .55 are printed.

a. Scores have been recoded; high score means high awareness.

b. This item is not included in the Efforts Useful scale.

to the solution of these problems. The authors labeled this factor Problem Awareness. The mean score was computed of items having a factor loading of .55 or higher on this factor. Scores could vary from 1 (*no problem at all*) to 5 (*definitely a problem*) ($M = 2.6$).

Factor 2 explained 10.4% of the total variance and referred to the extent to which respondents thought a reduction of car use is worthwhile. Scores on Efforts Useful were based on the mean score of items having a factor loading of .55 or higher on this factor. Scores could vary from 1 (*efforts are useless*) to 5 (*efforts are very useful*) ($M = 3.3$).

Factor 3 referred to the extent that an individual felt personally responsible for the problems of car use and possible solutions for it and explained 9.2% of the total variance. The mean score on the items having a factor

loading of .55 or higher was computed. Scores on Responsibility could vary from 1 (*not at all responsible*) to 5 (*very responsible*) ($M = 2.7$).

Preferred management strategy. Three items assessed people's preferences for environmental risk management strategies. First, respondents indicated whether they thought the problems of car use could be reduced by only technological measures. Second, respondents indicated whether they thought the problems of car use could only be resolved by radical reductions in car use.⁸ Third, people were asked whether they believed government measures aimed at reducing car use were necessary. For all three items, scores could vary from 1 (*not at all*) to 5 (*definitely*). The mean score on the three items was computed after reversing the scores on the first item. Scores on preferred management strategy could vary from 1 (*reducing car use not necessary*) to 5 (*reducing car use very necessary*) ($M = 3.2$). Cronbach's α of this scale was .75.

Evaluation of policy measures. Respondents were asked to evaluate the effectiveness and acceptability of seven different categories of policy measures aimed at reducing car use. These measures were (a) prohibition of car use on certain days, (b) car-free city centers, (c) rationing of fuel, (d) making car use more expensive, (e) improving quality of public transport, (f) an information campaign stressing the societal problems of car use, and (g) concentrating working, living, and shopping. The first four measures could be typified as push measures aimed at making car use less attractive. The other three measures were pull measures aimed at improving alternatives of car use without affecting the attractiveness of car use (E. M. Steg, 1996; L. Steg & Vlek, 1997). For each policy measure, scores could vary from 1 (*not at all effective* or *not at all acceptable*) to 5 (*very effective* or *very acceptable*). As expected, the judgments of the push measures as well as the ratings of the pull measures were correlated. Therefore, two subscales were constructed that displayed adequate internal consistency (push measures: $\alpha = .80$, $M = 2.6$; pull measures: $\alpha = .65$, $M = 3.7$). Scores could vary from 1 (*very unfavorably*) to 5 (*very favorably*).

DATA ANALYSIS

An analysis of variance (ANOVA) was conducted to examine whether significant differences could be found between myths of nature (i.e., respondents subscribing to different items of Table 1) in their mean scores on the main variables. For those cases in which the F test was significant at $p < .05$, a

Tukey test was conducted to identify the myths of nature that differed significantly at $p < .05$. Pearson's product-moment correlations were computed between environmental beliefs, behavior, and policy evaluations.

RESULTS

MYTHS OF NATURE, SOCIODEMOGRAPHIC VARIABLES, AND CAR USE

No systematic relationships were found between myths of nature and sex, income, educational level, and household size, respectively. However, respondents subscribing to nature benign and nature capricious were on average somewhat older than respondents adhering to nature ephemeral and nature perverse/tolerant: $F(3, 409) = 3.89, p < .01$.

No significant relationships were found between myths of nature in the average annual kilometrage traveled by car (as a driver). Yet, it appeared respondents subscribing to nature ephemeral often used other modes of transport instead of a car ($M = 3.3$), whereas respondents favoring nature perverse/tolerant ($M = 2.6$) and nature capricious ($M = 2.1$) relatively used their cars more often: $F(3, 265) = 6.76, p < .001$. The nature benign view took a middle position and did not differ significantly from the other three myths of nature.

MYTHS OF NATURE AND ENVIRONMENTAL BELIEFS

As hypothesized, the relation between myths of nature and environmental beliefs was unidimensional (see Figure 2). Nature ephemeral was associated with a higher problem awareness, $F(3, 265) = 27.83, p < .001$; evaluating efforts to solve the problems by reducing car use as more useful, $F(3, 265) = 20.73, p < .001$; and feeling more responsible for the problems of car use and possible solutions for it, $F(3, 265) = 15.41, p < .001$, in contrast to the nature perverse/tolerant view and especially compared to the nature benign view and the nature capricious view. No significant differences were found between the nature benign view and the nature capricious view.

MYTHS OF NATURE AND PREFERRED MANAGEMENT STRATEGY

Nature ephemeral was associated with evaluating reductions in car use as more necessary than the nature perverse/tolerant view, whereas people

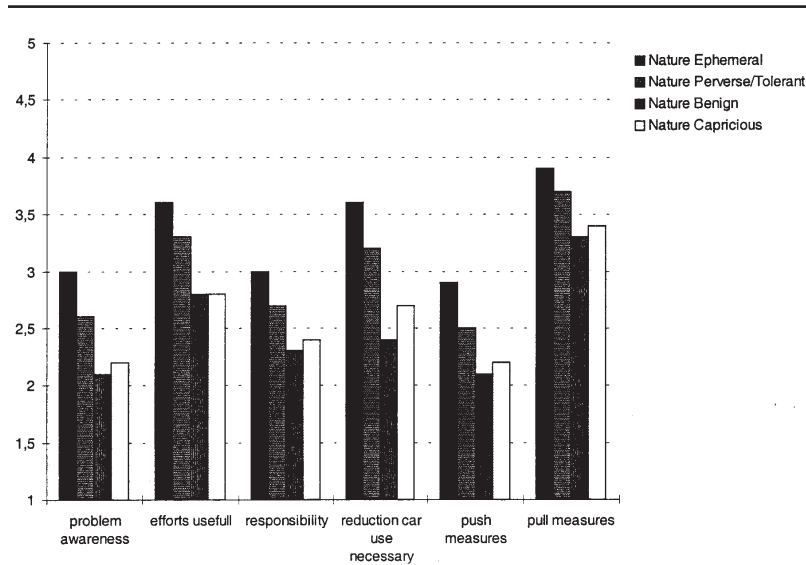


Figure 2: Myths of Nature and Environmental Beliefs, Preferred Management Strategy, and Evaluation of Push and Pull Measures

adhering to nature capricious and especially nature benign evaluated policy measures as less necessary: $F(3, 409) = 46.64, p < .001$ (see Figure 2).

MYTHS OF NATURE AND POLICY EVALUATION

Figure 2 also shows the mean scores on the evaluation of the push and pull measures. As hypothesized, respondents adhering to nature ephemeral evaluated push measures, $F(3, 409) = 21.35, p < .001$; as well as pull measures, $F(3, 409) = 17.54, p < .001$, more favorably than respondents subscribing to nature benign and nature capricious. As expected, the nature perverse/tolerant view took a middle position. Again, no significant differences were found between the nature benign view and the nature capricious view.

ENVIRONMENTAL BELIEFS, BEHAVIOR, AND POLICY EVALUATIONS

Table 3 shows car use was related to specific environmental beliefs. The higher respondents' problem awareness, the lower their annual kilometrage

TABLE 3
Correlations Between Environmental Beliefs
and Car Use Behavior and Policy Evaluations

	<i>Problem Awareness</i>	<i>Efforts Useful</i>	<i>Responsibility</i>
Annual kilometrage	-.26*	.08	.03
Proportion of car use	.37*	.20*	.08
Reducing car use necessary	.70*	.44*	.39*
Push measures	.59*	.38*	.37*
Pull measures	.47*	.43*	.32*

* $p < .001$.

($r = -.26$) and the more they used other modes of transport instead of a car ($r = .37$). Moreover, the more respondents thought a reduction of car use was worthwhile, the more often they used other modes of transport instead of a car ($r = .20$). However, sense of responsibility was not significantly related to car use behavior. Table 3 also shows that environmental beliefs were significantly related to policy evaluations. A higher problem awareness, a stronger belief in the usefulness of reductions in car use, and a higher sense of responsibility for the problems of car use and their solutions were associated with a more favorable evaluation of policy measures aimed at reducing car use.

DISCUSSION

The aim of this study was to examine the relationships between myths of nature and the perception of environmental risks, the evaluation of environmental risk management strategies, and risk-taking behavior in relation to a concrete environmental problem, namely, the problems of car use. Results of this study showed that people subscribing to different myths of nature did indeed differ in the way they perceived the problems of car use and in their preferences toward policy measures aimed at managing these problems. So, cultural theory, which was originally developed by anthropologists, seems to contribute to the understanding of environmental risk perception and risk judgments at an individual level.

As hypothesized, the relation between myths of nature and environmental beliefs and preferences for policy measures appeared to be unidimensional. Nature ephemeral was associated with a higher problem awareness and a higher sense of responsibility for the problems of car use and their solutions,

especially compared to the nature benign view. This suggests that myths of nature do influence more specific environmental beliefs (see also Stern et al., 1995). Moreover, nature ephemeral was associated with evaluating a reduction in car use as more necessary and evaluating push as well as pull measures more favorably, again especially compared to the nature benign view. So as expected, people subscribing to nature ephemeral were the most inclined to call for strict preservation of the environment. On the other hand, respondents adhering to nature benign did have more faith in technological solutions, and they thought that measures aimed at reducing car use were less necessary. Contrary to the expectation, respondents subscribing to nature capricious appeared to be consistent in their thinking and acting; except for a minor (but significant) difference in the preferences for management strategies, their judgments did not differ significantly from the judgments of the nature benign view. Moreover, environmental beliefs and policy preferences appeared to be correlated. So, risk perceptions were related to preferences for risk management strategies as expressed in the myths of nature.

Myths of nature were hardly related to behavior, but some of the specific environmental beliefs were related to car use. This is consistent with the proposition made by Stern et al. (1995); namely, value orientations, general beliefs, and worldviews do influence specific beliefs, attitudes, and norms, but they are not directly related to behavior. The relation between myths of nature and car use (especially the total kilometrage) is probably mediated by other factors such as the situational circumstances and self-efficacy (see Steg, 1996, and Vlek & Steg, 1996, for an overview of situational factors influencing car use behavior). Future research should examine the factors that might prevent people from translating myths of nature into action.

Risk perception and risk judgments become more and more important in modern society (Beck, 1992), especially with regard to environmental problems. The nature, seriousness, and the consequences of most environmental problems are uncertain and are unfamiliar to people. Therefore, the way one deals with these environmental problems is to a large extent dependent on risk perception and risk judgment. Cultural theory asserts that the perceptions toward environmental risks can be categorized in four myths of nature based on different rationalities. Policy measures aimed at reducing environmental problems should take the different rationalities of the myths of nature, or more generally, of the cultural biases, into account. For example, risk communication should be in line with the cultural biases of the target group (Palmer, 1996). People tend to have more trust in risk communication if the message is in line with their cultural biases (Earle & Cvetkovich, 1999). The

myths of nature (studied here) represent four fundamentally different value frameworks that lead to very different ways of seeking and accepting risks. From a cultural theory perspective, ideally, the uncertainty to which culture is a response should be reduced (Roe, 1996). However, this is not always possible. In that case, policy makers should recognize the importance of cultural biases and myths of nature in risk perception and risk-taking behavior.

Understanding individual differences in risk perception and risk judgments might facilitate the development of effective environmental risk management strategies. Policy measures might be more effective when they address the main determinants of the behavior and when the beliefs and perceptions of the target group are taken into account. These results suggest that people adhering to nature ephemeral thought they could and should contribute to the solutions of the problems of car use. Moreover, they thought policy measures aimed at reducing car use were necessary and acceptable. In contrast, respondents favoring nature benign and nature capricious perceived their own contribution to be less important and would probably object to policy interventions aimed at reducing car use. So, the latter groups should be approached in a different way; more effort should be made to inform them about the problems and effective solutions for it and about how they personally can contribute to these solutions. The information should (also) be given by sources that are expected to have the same values and beliefs, for example, as expressed in the myths of nature because these sources will be trusted more (Earle & Cvetkovich, 1995; Siegrist, Cvetkovich, & Roth, 1999).

Myths of nature have been applied to describe and explain differences in environmental risk perception and risk judgments (Roe, 1996; Van Asselt et al., 1996) probably because they provide a simple and straightforward metaphor. These (descriptive) studies would make much more sense if the propositions made were supported by empirical evidence. The first attempts to gain empirical evidence for cultural theory, among which includes this study, are promising. The authors were able to empirically validate some of the propositions made. Future research should examine whether the results generalize to other environmental issues and behaviors. More attempts should be made to find empirical support for cultural theory. Especially, the relation between the three main constructs (social relations, cultural biases, and preferences for behavioral strategies) that are central to cultural theory should be empirically validated. This requires that (better) measures should be developed to assess myths of nature, cultural biases, social relations, and other relevant constructs on an individual level. In this study, people were categorized based on a one-item measure. The authors did not assess respondents' position on the different dimensions of the myths of nature and were not able to examine

whether different views within a myth of nature are indeed correlated (although the results revealed that environmental beliefs and policy preferences are indeed correlated). Currently, a multi-item scale for measuring myths of nature is being developed and tested.

Myths of nature should be related to other general beliefs and worldviews as well as to value orientations such as the New Ecological Paradigm (Dunlap & Van Liere, 1978; Stern et al., 1995); social value orientations (McClintock, 1972); Schwartz's (1992) value clusters; value orientations identified by Stern et al., (1993); Inglehart's (1990) (post) materialist values; and the theory of cosmopolitanism (Earle & Cvetkovich, 1997) for these might overlap to some extent. Moreover, the relation between myths of nature and response patterns to hazards (Burton, Kates, & White, 1978; Laska, 1990; Stallen & Tomas, 1988) should be examined for there seem to be some parallels between these approaches. Furthermore, the relation between these general values and belief systems and more specific beliefs, attitudes, norms, and behavior should be studied to understand how general values and beliefs are translated into action.

NOTES

1. Strictly speaking, the classification is fivefold because it is possible under certain conditions for individuals to pull back from all four engaged ways of life. This is the hermit's way of life. Hermits withdraw from all coercive social involvement and are therefore mostly taken off the social map (Schwarz & Thompson, 1990).

2. Sjöberg (1996) used the British version of the four scales of cultural biases, whereas Dake (1991) and Wildavsky and Dake (1990) used the American edition. However, these versions do not differ much.

3. Quite different measurements of environmentalism were used, so the results of these studies are not fully comparable. Grendstad and Selle's (1997) measurement of environmentalism is very broad and involves beliefs, intentions, and behaviors, whereas Ellis and Thompson's (1997) measurement of environmentalism only refers to environmental beliefs. Moreover, although in both studies measures of cultural biases are based on items referring to views on human nature, political preferences, and ideas of fairness, the scales used differ to some extent.

4. The myths of nature are in essence different beliefs on the vulnerability of nature. The myths of nature originate from ecological research and were adopted by cultural theory because they map onto the typology of social relations (Schwarz & Thompson, 1990). Therefore, this is the only cultural bias that is labeled.

5. This only applies to the perception of environmental risks. As said earlier, the cultural biases each engender a different ranking of risks.

6. The statements are based on the graphical representation of the four myths of nature (see Figure 1); these graphical representations were used in the research of Grendstad, Selle, and Strømsnes (1997).

7. According to Schwartz (1977), under conditions of high problem awareness and a high sense of responsibility, individuals will experience a sense of moral obligation to prevent or solve the problems. This *personal norm* is supposed to motivate action. It is beyond the scope of this article to study the relations between problem awareness, perceived coresponsibility, and personal norm in more detail.

8. Note that these statements resemble the statements used to measure myths of nature. However, they differ in the target behavior; the measurement of myths of nature refers to behavior and environmental problems in general, whereas this measure refers to car use and to environmental problems related to car use. These measures do not inevitably need to correlate highly because beliefs related to environmental problems in general do not have to correspond with beliefs on the problems of car use. For example, environmental attitudes do hardly correlate with car use (NIPO, 1995).

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