Environmental Concern: A Global Perspective

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Abstract

Measurement and early exploration of the determinants of environmental concern was pioneered by Dieter Urban. Here, we focus primarily on the relation between the wealth of nations and environmental concern. Based on survey data environmental sociologists assert that citizens in poor countries exhibit a larger degree of environmental concern than citizens in wealthy countries. However, a detailed analysis points to an interaction effect with different dimensions of environmental concern. While there is evidence for a negative correlation between per capita GNP and environmental awareness of local ecological problems, environmental concern with global problems is positively correlated with nations' wealth. Environmental concern is important for legitimizing institutions but has only a modest effect on individual behavior. Institutional regulations such as the implementation of an ecological tax regime or emission certificates could change behavior by discouraging environmentally harmful consumption and rewarding ecologically friendly behavior. However, institutions will not be effective without acceptance by citizens and, at least in democratic societies, change in laws and institutions requires the political will of the voters. In this regard, citizens' environmental concern plays a central role in determining environmental behavior.

Keywords

Global environmental concern; International Social Survey; Health of Planet Survey; dimensions of environmental concern; income and environmental awareness; rating and ranking questions

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1 Introduction

Environmental concern is an important issue in the environmental debate. Much research has been conducted on the questions of what it is, how it can be measured, how it comes about and what its consequences are.

Dieter Urban was one of the pioneers to tackle these questions in sociological research. He considered environmental concern a multi-dimensional construct consisting of values, environmental attitudes, and intentions to act ecologically responsible (Urban 1986, 1991). This concept and its validity was explored by data collected in a large German city in 1985. From a methodological perspective, path- and regression analysis has been employed as well as structural equation modeling (SEM), logit models, and methods of longitudinal data analysis in his later research (e. g. Urban 1996, 2000). Dieter Urban is not only well known for his innovative research on important problems of empirical sociological research but also for his many insightful contributions to methodological issues. Here we build on his concept of environmental concern.

According to a widely accepted definition, environmental concern is individuals' awareness that the state of the environment is threatened by human-inflicted resource depletion and pollution. Environmental awareness is also associated with an individual's willingness to protect the natural environment from harmful human impact. Environmental concern, along with many attitudinal concepts in psychology is often seen as consisting of three components: a cognitive component, an affective component, and a conative component. The first dimension refers to rational insight into the problem, the second to a negative emotional reaction toward environmental destruction and the third to willingness to contribute to the protection of the natural environment. How environmental concern emerges in a population, how it spreads and under which circumstances it might eventually decline are the subjects of ongoing debate. There are at least four major theoretical approaches to reconciling the somewhat contradictory information on the processes of emergence and decline. In the following section, we will briefly summarize the four approaches.

The Origins of Environmental Concern

Anthony Downs (1972) was probably among the first researchers to think about the emergence and decline of environmental awareness among members of the general public. According to Downs, problems such as the ecological problem "suddenly leap into prominence, remain there for a short time and then – though largely unresolved – fade from the center of public attention". Downs called this process the issue-attention cycle, and asserted that it was characterized by five sequential

states. In Phase One, some experts notice a problem and bring it to public attention. In Phase Two, the public becomes aware of the existence of the problem and emphatically demands its resolution of its politicians. However, in Phase Three the costs of resolving the problem slowly become evident, which leads the public to gradually lose interest in the problem in Phase Four. Finally, the fifth post-problem phase is reached. Downs believed in 1972, shortly after Meadows et al. (1972) had published their "limits to growth" theory, that the American public was already about to enter Phase Three with regard to environmental concern.

A less pessimistic view was formulated by Ronald Inglehart. According to Inglehart (1995, 1997), environmental awareness is part of a more general fundamental value change that takes place as societies become more industrialized. As societies become more developed and affluent, their members are liberated from economic struggle and can instead concern themselves with post-materialistic goals such as political freedom, individual self-fulfillment and environmental protection. Inglehart postulated that the shift from materialism to post-materialism is, fortunately, irreversible as long as material prosperity continues. He tested the hypothesized positive correlation between prosperity and environmental concern with data from the World Values Survey. However, his hypothesis was only partly supported by the data, since some of the countries whose citizens displayed high levels of environmental concern were developing nations. In response to this unexpected finding, Inglehart formulated his hypothesis of "objective problems and subjective values". According to this hypothesis, citizens in wealthy nations form pro-environmental attitudes in the process of adopting post-materialistic values in general, and not necessarily in response to immediate problems. Citizens of poorer nations, on the other hand, are faced with pressing local environmental problems (polluted cities, lack of clean water access) and demand the resolution of these objective problems. Thus, environmental awareness is a consequence of prosperity, albeit not a direct one as it is mediated by a change from materialist to post-materialist values. Citizens of poor nations may very well be concerned about the environment. However, their concern stems from concrete and immediate local problems, not from a shift to post-materialist values.

Inglehart's position has been challenged by Dunlap and Mertig (1996) (see also Dunlap, Gallup and Gallup 1993, or more recently Dunlap and York 2008) who argue that concerns about the natural environment have spread throughout the world and have become a global phenomenon. In keeping with earlier work on the development of a "new ecological paradigm" (Dunlap and van Liere 1978), they argue that environmental concerns are not confined to industrialized countries, but are also present in many third-world countries. Nor, in their view, is concern about the environment limited to the elites in developing nations; they argue that

such concern has spread to the general population as well. They bolster their assertion with empirical evidence from the World Values Survey and show that the survey's environmental-concern items are negatively correlated with countries' GNP per capita.

However, there is a fourth position, the so-called affluence hypothesis, which challenges the Dunlap and Mertig's interpretation of these data (see Diekmann and Franzen 1999, Franzen and Vogl 2013a). The observation that environmental concerns have increased in Western industrialized nations (see e. g. European Commission 1992)[1] as well as in third-world countries until the beginning of the 1990s, and has more or less remained unchanged thereafter is amply supported by the data (Franzen and Vogl 2013b). However, there is still considerable variation in the levels of concern voiced in different countries, and one factor that may be able to explain such differences in environmental awareness is economic well-being.

Standard economic reasoning suggests that the restoration of a damaged environment is not only a collective good but also at least a "normal" good or even a "superior" good, i. e. one for which demand rises over proportionally with income. If scarce resources are devoted to bettering the environment, these resources can no longer be devoted to the consumption of other goods. Thus, as a population becomes wealthier the demand for more environmental quality should rise, which should, in the aggregate, result in a positive correlation between a country's wealth and its level of environmental responsibility, or the intensity of measures taken to improve the state of the environment.

In Section II, we focus on this relationship between a nation's wealth and its public's degree of environmental concern by analyzing data from the International Social Survey Program (ISSP). Both Inglehart's hypothesis as well as the affluence hypothesis postulates a positive correlation between wealth and environmental concern, while Dunlap and Mertig's so-called globalism hypothesis assumes a negative relationship. We will discuss the apparent contradiction between evidence garnered from the International Social Survey and the results of the HOP Survey in Section III. In Section IV, we attempt to synthesize those opposing findings, arguing that the two positions stress different dimensions of environmental attitudes. In Section V, we discuss the effect of environmental concern on environmental behavior. We argue that the effect is smaller on the individual level than on the collective level of institutional and policy change.

1 Although respondents in most Western countries still report high levels of concern, this concern has declined in some countries in the past decade.

2 Results of the International Social Survey

The ISSP collects individual data in several countries at yearly intervals on rotating topics of interest. In 1993, 2000 and 2010 the survey focused on environmental issues. In the latest survey from 2010 data was collected from random population samples in 32 countries using mostly a written questionnaire delivered after the respondent's participation in an unrelated face-to-face or telephone interview.

Table 1 contains information on the countries participating in the survey, including the number of respondents in that country, values for an index of environmental concern, and GDP per capita in 2010 US dollars (PPP). The index is the sum of responses (on a five-point scale) to the nine items listed in Table 2. The reliability (Cronbach's alpha) of the index is 0.70 for the whole sample (N = 36'927) but varies slightly between countries.

Tab. 1 Countries participating in the 2010 ISSP survey (own illustration)

Country	N	Concern	GDP per capita in US$ (PPP)
Switzerland (CHE)	1212	60.2	52967.38
Canada (CAN)	985	56.5	39844.44
Denmark (DNK)	1305	55.3	41957.61
Finland (FIN)	1211	54.8	38741.41
Sweden (SWE)	1181	54.1	42021.51
South Korea (KOR)	1576	53.9	29738.22
Japan (JPN)	1307	52.9	35157.29
Taiwan (TWN)	2209	52.6	38592.77
Norway (NOR)	1382	52.1	61520.22
Germany (DEU)	1407	51.9	40848.85
New Zealand (NZL)	1172	51.7	31256.78
Austria (AUT)	1019	50.8	42382.59
France (FRA)	2253	50.8	37284.25
Chile (CHL)	1436	50.6	18964.05
Spain (ESP)	2560	50.4	32251.94
United States (USA)	1430	50.3	48310.34
Slovenia (SVN)	1082	50.0	28054.51
Belgium (BEL)	1142	49.4	40122.27
Israel (ISR)	1216	47.4	29011.71
Great Britain (GBR)	928	46.6	35868.75
Mexico (MEX)	1637	46.4	15628.84
Slovak Republic (SVK)	1159	45.5	24555.27

Country	N	Concern	GDP per capita in US$ (PPP)
Argentina (ARG)	1130	44.8	18529.32
Turkey (TUR)	1665	44.1	16899.76
Czech Republic (CZE)	1428	42.9	27497.56
Croatia (HRV)	1210	42.0	19453.57
Russia (RUS)	1619	41.4	22638.64
Lithuania (LTU)	1023	40.4	20550.54
Latvia (LVA)	1000	39.8	17856.33
Philippines (PHL)	1200	39.3	5550.356
Bulgaria (BGR)	1003	38.7	15669.93
South Africa (ZAF)	3112	38.5	11785.75

Notes: The second column reports the number of cases per country, and the third column the standardized mean (between 0 and 100) of environmental concern.

For correlational analysis of GDP per capita and responses to environmental items, we use the Spearman coefficient. The analysis is therefore based on the rank ordering of variables. This procedure has the advantage of accommodating possible non-linearities in the data. In addition, the Pearson correlation coefficient is computed with both GDP per capita and the logarithm of GDP per capita. Table 2 displays the results. Notably, all correlations are positive and seven out of nine Spearman coefficients are significant for $p \leq .05$.

Also, the correlation between the index and GDP is highly positive and significant, its value being 0.83. Hence, the ISSP data clearly confirm the affluence hypothesis, which postulates a positive relationship between the standard of living and environmental awareness.

Tab. 2 Environmental awareness in international comparison (own illustration)

		% – agreement/ disagreement		
		ϕ all countries	ϕ OECD countries	ϕ None-countries
1)	I do what is right for the environment, even when it costs more money or takes more time. (agreement)	48 (0.35)	49	45
2)	How willing would you be to accept cuts in your standard of living in order to protect the environment? (agreement)	32 (0.56)*	33	26
3)	How willing would you be to pay much higher prices in order to protect the environment? (agreement to higher prices)	32 (0.58)*	34	25
4)	How willing would you be to pay much higher taxes in order to protect the environment? (agreement)	23 (0.29)	24	20
5)	Modern science will solve our environmental problems with little change to our way of life. (disagreement)	43 (0.58)*	48	28
6)	People worry too much about human progress harming the environment. (disagreement)	40 (0.59)*	42	31
7)	We worry too much about the future of the environment and not enough about prices and jobs today. (disagreement)	40 (0.53)*	41	36
8)	It is just too difficult for someone like me to do much for the environment. (disagreement)	47 (0.71)*	51	35
9)	In order to protect the environment Switzerland (country) needs economic growth. (disagreement)	23 (0.65)*	25	16

Note: Data source is the ISSP 2010. * = Spearman rank correlation coefficient for per capita GNP in 2010 that is significant at the 5 % level. All items were combined in an index that has a Cronbach's alpha coefficient of 0.70 (N = 36'927). The Spearman rank correlation between the index of environmental concern and GDP 2010 is 0.83, the Pearsons' correlation is 0.81 and the Pearsons' correlation coefficient with the log of GNP is 0.80 (N = 32).

3 Evidence from the Health of Planet survey

The HOP Survey was conducted in 1992 in 24 countries (Table 3). Dunlap and Mertig (1994, 1996) report a negative correlation with GDP per capita for most items related to the environment. Take, for instance, the question of how serious people consider the environmental problems in their nation to be. Respondents in countries with relatively low GDP per capita, such as Poland, Mexico and Russia provide the highest percentages of "very serious" answers, while respondents in wealthy countries such as the Netherlands, Denmark and Finland provide the lowest percentages of such answers. The correlation with GDP per capita is negative, although not significant.

Tab. 3 Environmental concern and GDP per capita from the HOP Survey (own illustration)

Item	GDP p.c.	log of GDP
Perceived seriousness of ecological problems in one's own country	-0.17	-0.12
Perceived importance of environment as compared to other national problems	0.70***	0.72***
Personal concern about environmental problems[a]	-0.50*	-0.12
Perceived quality of national environment	-0.58**	-0.49*
Perceived quality of local environment	-0.63***	-0.57**
Perceived quality of global environment	0.47*	-0.12
Perceived consequences of environmental quality on present health condition	-0.70***	-0.66***
Perceived responsibility of past environmental quality for present health condition	-0.29	-0.12
Perceived consequences of future environmental quality on future health conditions	-0.55**	-0.45*
Average perceived seriousness of six local environmental problems	-0.56**	-0.60**
Average perceived seriousness of seven global environmental problems	0.07	-0.12
Average support for six policies to improve environmental quality	-0.78***	-0.64***
Preferred priority between economic growth and environmental protection	0.55**	0.74***
Willingness to pay higher prices to protect the environment	0.54**	0.69***

Source: Dunlap and Merting 1996. The coefficients reported are the Pearson correlation coefficients, *p <.05, **p<.01, *** p< .001, a Poland omitted

Now let us turn to the ranking question on the "most important problem facing our nation today." The percentage responding with some type of environmental problem is also displayed in Table 4. The rank order for the amount of environmental concern voiced in answer to this question in the various countries is very different.

Tab. 4 Differences in a country's level of environmental consciousness for "closed" versus "open" question (own illustration)

Question 1:		**Question 2:**	
I'm going to read a list of issues and problems currently facing many countries. For each one, please tell me how serious a problem you consider it to be in our nation – very serious, somewhat serious, not very serious, or not at all serious?		What do you think is the most important problem facing our nation today?	
Rating % who think the environment is **"very serious"** issue in their nation		**Ranking** % who think the environment is **"the most important"** problem in their nation	
Germany	67	Ireland	39
South Korea	67	Netherlands	39
Poland	66	Mexico	29
Mexico	66	Finland	28
Switzerland	63	Portugal	25
Russia	62	India	21
Turkey	61	Switzerland	20
Chile	56	Chile	20
Canada	53	Turkey	18
Hungary	52	Denmark	13
United States	51	Japan	12
Portugal	51	United States	11
India	51	Canada	10
Brazil	50	Germany	9
Nigeria	45	Russia	9
Uruguay	44	South Korea	9
Japan	42	Norway	7
Norway	40	Great Britain	3
Philippines	37	Uruguay	3
Great Britain	36	Brazil	2
Ireland	32	Philippines	2
Netherlands	27	Poland	1
Denmark	26	Hungary	1
Finland	21	Nigeria	1

Data source: Dunlap, Riley E.; Gallup, George H. and Gallup, Alec M: Of Global Concern. Results of the Health of the Planet Survey, in: Environment, Vol. 35, 1993.

For example, while Poland ranks among the top in its answers to the seriousness question, it ranks among the last in its answers to the importance question. The Netherlands, on the other hand, moves from a low position in the concern ranking to the top position.[2] Furthermore, the rank order correlation of per capita GNP and environmental concern expressed in response to the importance question is positive and significant for $p < 0.05$. Its value is 0.36.

Note that both the ranking of nations with respect to environmental concern and the direction of the correlation with GDP per capita depend strongly on the type of question asked.[3]

That two items intended to measure the same concept provide inconsistent results requires an explanation. We also need to account for the fact that the correlation with GDP is negative for the seriousness question and positive for the importance question.

While the 'how serious' question is a **rating** task for the respondents, the 'how important' question is an (incomplete) **ranking** task. To answer the ranking question, one has to choose the most important problem from a list of those that come to mind. The ranking task requires comparing the importance of a given goal with that of other goals. This is a more economic decision, as one cannot "vote" for the solution of all problems simultaneously as one can in answering the rating question.

We assume that the ratings and rankings provided by the respondents are related to different dimensions of environmental consciousness. The rating question measures mainly the degree of concern about environmental problems. On the other hand, the ranking question measures the economic priority afforded to the environment in terms of the distribution of scarce resources. While the priority given to the environment is expected to correlate positively with GDP, this does not necessarily hold true for environmental concern.

Dunlap and Mertig report correlations with per capita GNP for fourteen of the HOP Survey items or indices (displayed in Table 3, adapted from Dunlap and Mertig 1996). Nine of these correlations are negative, five are positive. The positive correlations are for items addressed either to the economic priority assigned to the environment or to the importance of global environmental problems. In contrast, the negative correlations are for items related to concern about local environmental problems and resulting health risks. Thus, the set of HOP items is at least two-di-

2 The high percentage for Ireland in an artifact produced by the mention of the environmental problem before the question on the importance of various issues (Dunlap et al. 1993, S. 39).

3 Dunlap, Gallup and Gallup (1993) are aware of this problem. They publish the results of both questions in their thorough documentation. However, they do not discuss the striking differences in these results.

mensional.[4] Now, compare this analysis with our analysis of the ISSP data (Table 2). Most of the ISSP items are related to the economic dimension of environmental problems. In keeping with our reasoning, the correlations with per capita GDP are positive for the ISSP items but negative for the majority of the HOP items.

4 Two dimensions of environmental concern

Our analysis of the International Social Survey Program (ISSP) data from 32 countries reveals that correlations between environmental attitudes and average income (GDP per capita) are positive for all items and, moreover, seven out of nine correlations are significant ($p \leq .05$). Contradictory results are reported by Dunlap and Mertig (1994, 1996) using data from the Health of the Planet (HOP) survey. These data were collected in 24 countries, including several from the Third World. Correlational analysis of items with GDP per capita reveals that nine items are negatively correlated with GNP, while five items correlate positively.

Closer inspection of questions posed in the two surveys and inspection of the two alternative question modes in the HOP survey (ranking versus rating) yields clear evidence that the seemingly contradictory findings can be reconciled if we reconsider the assumption that environmental concern to be measured is one-dimensional. We believe they are at least two-dimensional. One dimension relates to an awareness of environmental problems occurring mainly in one's own community, which are then rated as more or less serious. The second dimension, on the other hand, relates to the willingness and ability of people to give something up in order to make environmental goals a priority. The former dimension correlates negatively with GDP per capita while the latter correlates positively (Figure 1).

Why is the correlation negative with regard to awareness of local environmental problems but positive with regard to the priority dimension? Of course,

4 Our hypothesis might well be further investigated through a factor analysis of the HOP data. Moreover, it may be the case that not two, but three dimensions could be identified: 1. Concern about local environmental problems. 2. Priority of the environment in an economic sense. 3. Concern about environmental problems on a global scale. Separating environmental concern into a local and a global component means that wealthier countries and countries that have been more successful in dealing with local environment problems could be expected to be more concerned about global environmental problems. A further implication is that these countries would exhibit greater commitment to their international treaty obligations. We are indebted to an anonymous reviewer for outlining this argument.

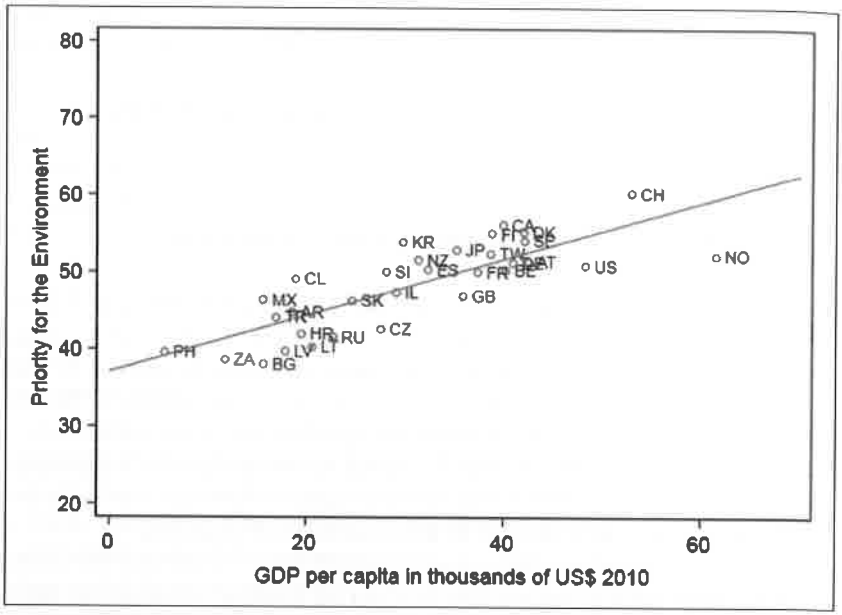

Fig. 1 Priority of the environment as a function of national income (own illustration)

Note: The priority-of-the-environment index consists of the average sum of agreement (or disagreement) with the 9 items listed in Table 2. Data are from the ISSP 2010. The Spearman correlation is 0.83.

in many poor countries the environmental problems noticeable at community level are much more severe than similar problems in rich countries. The World Bank (2005) report on "Environment Matters" provides evidence for the massive environmental and health problems of less developed countries. Lack of access to safe water and sanitation, and toxic pollution are sad realities for millions of people living in poor and less developed countries[5]. On the other hand, people in richer

5 "Globally, some 1.1 billion people lack access to safe water and 2.6 billion lack access to safe sanitation. One of the well-known environmental health consequences of this situation is that there are about 4 billion cases of diarrhea per year, which cause 1.8 million deaths, mostly among children under five" (Trace 2005, p. 12). Other kinds of pollution are also a problem. In addition to urban air pollution, indoor air pollution (for example of the kind produced by wood fires used for cooking) presents a high health risk, particularly for children and women, causing 1.6 million premature deaths per year (Leitner 2005, see also Ezati and Kammen 2001).

countries can afford to spend more resources in order to improve environmental quality[6]. While Dunlap and Mertig (1994, 1996) are correct in asserting that there is growing environmental concern in the Third World, they are wrong in rejecting the affluence hypothesis. Our analysis of both ISSP and HOP Survey data provides clear evidence that the tendency to give priority to environmental goals is much stronger in wealthy countries than in poorer ones.

Dunlap and York (2008) provided further evidence supporting the globalism hypothesis using data from the World Values Survey. However, closer analysis and comparison with the ISSP shows that also the data of the World Values Survey supports the affluence hypothesis (see Franzen and Vogl 2013a).

5 The relevance of environmental attitudes

As we have shown, there is a substantial difference in environmental concern among different countries. But what about the impact of environmental concern on behavior? How does citizens' environmental concern affect the environmental policy or behavior of a given country? To answer this question, the effect of concern on behavior should be examined on two different levels: the level of individual environmental behavior and the collective effect of governmental environmental policy.

Environmental attitudes and economic incentives

Many studies show that environmental concern has only a moderate influence on environmental behavior. For instance, a meta-analysis by Hines et al. (1987) of 51 studies found an average correlation between concern and behavior of 0.35. Furthermore, this correlation varies strongly depending on the type of behavior under consideration. Diekmann and Preisendörfer (1998, 2003) found a weaker relationship between a general measurement of concern and mobility behavior than between concern and ecological shopping and recycling behavior (also see Derksen and Gartell 1993). Generally, higher correlations are observed if ecological behavior imposes only minor costs on individuals. The relationship between costs and the intensity of moral or ideological influences on behavior is also well known in Economics (North 1986, Kirchgässner and Pommerehne 1993) and is often referred to as the low-cost hypothesis.[7] The low-cost hypothesis postulates an

6 Also see Inglehart's propositions as described in the introduction of this article.

7 See Diekmann and Preisendörfer (2003) for a discussion and empirical test of the hypothesis.

interaction effect between environmental concern and the costliness of a certain behavior (for example, a monetary price or personal discomfort) in determining the amount of pro-environmental behavior, with the influence of environmental concern diminishing with increasing costs.

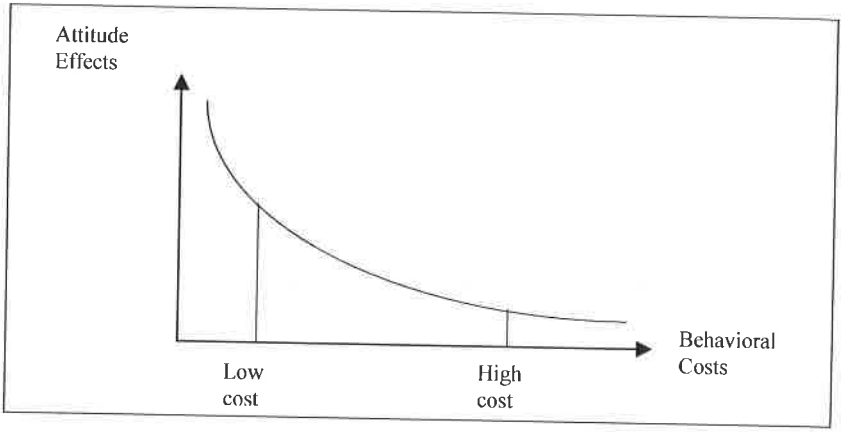

Fig. 2 The Low-Cost Hypothesis

Generally, the cost of ecologically friendly mobility behavior is high in automobilized Western societies. Other activities, such as for example recycling bottles, require lower time commitment than giving up driving a personal car or traveling by plane. Given the high costs of changing such high-cost behaviors, moral appeals to do so have almost no effect. However, behavior in high-cost situations does respond strongly to economic incentives. This response can be demonstrated by examining the consumption of gasoline as a function of its price. Empirically, the price elasticity of gasoline can be demonstrated either by longitudinal studies in which the price of gasoline varies across time or by cross- country comparisons in which it varies across locations. There are a number of such studies that show a negative relationship between the price and consumption of gasoline (e.g. Mauch et al. 1992, Franzen 1997).

This relationship between gasoline price and consumption in the OECD countries is also demonstrated in Figure 3.[8] The exact estimate of the price elasticity

8 Two countries were excluded from the analysis: Luxembourg because it is very small and most of its gasoline consumption is due to its neighbors and Turkey because it has

of demand depends on the particular demand function assumed and the current price level. But in general, demand reacts strongly to energy prices, with greater long-term than short-term effects (for a review see Goodwin, Joyce, Hanly 2004). The overall reduction in demand is produced by various substitution processes. In the short run, drivers simply reduce their automobility, while in the long run they tend to buy the more fuel-efficient cars that are manufactured by the auto industry in response to increasing demand.

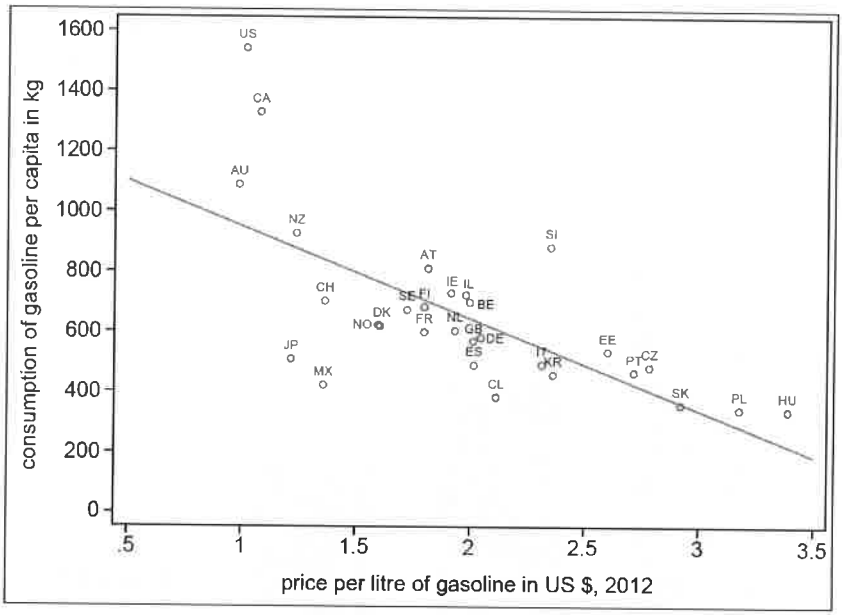

Fig. 3 Gasoline Prices and the Demand for Gasoline in the OECD Countries

Source: The authors' own calculations using data from the International Energy Agency (final road consumption of gasoline and diesel oil; mean price per litre of gasoline and diesel oil using PPPs) and the OECD (Population Data). Turkey and Luxembourg were omitted. The Pearson correlation between consumption and price is r = -0,69 (Spearman r = -0.71).

It is well known that American automobile drivers benefit from the lowest gasoline prices in any Western country. As a consequence, their consumption of energy

a relatively low per capita GNP.

is also among the highest. Proponents of ecological policies often argue that economic growth and overconsumption of environmental resources go hand in hand. However, this is not necessarily the case. A comparison of the United States and Europe demonstrates that a high standard of living can also be reached with comparatively low energy consumption. The standard of living is approximately as high in Europe or Japan as it is in the United States, but the amount of per capita CO_2 emissions is twice as large in the U.S. as in the E.U. or Japan. The simple graph (see Figure 4) provides support for the notion that economic growth, wealth and a high standard of living need not be accompanied by high levels of environmentally harmful emissions. There are many degrees of freedom for the reduction of emissions through more efficient use of resources while maintaining the same level of wealth (see also Weizsäcker et al. 1998).

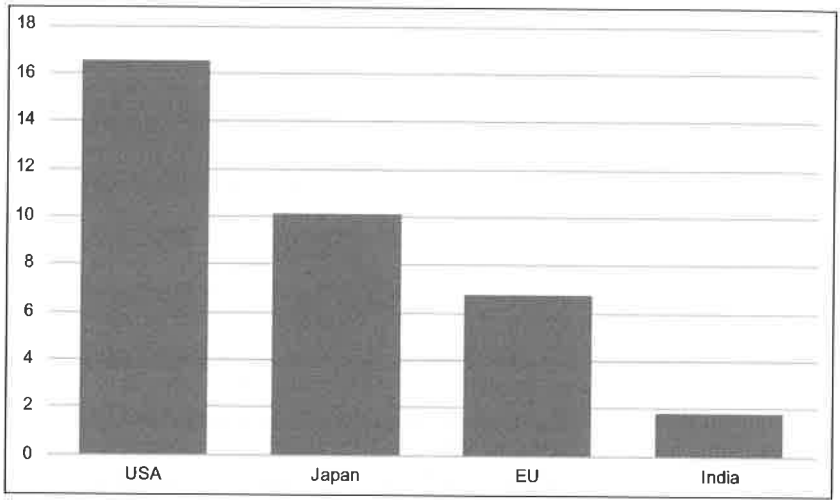

Fig. 4 An International Comparison of CO_2 Emissions

CO_2 emissions per capita in 2014. Data Source is the Emission Database for Global Atmospheric Research (Olivier et al. 2015).

A longitudinal comparison of gasoline prices demonstrates that the real price of gasoline (net of inflation) has actually dropped and not risen during the post-war era (see Figure 5 for the example of prices in Switzerland). The low price of energy is responsible for the increase in energy consumption in the post-war era. Many

phenomena of modern industrialized societies such as the spread of urban sprawl and the resulting increase in traffic between suburbs and inner cities have the same cause: low energy prices.

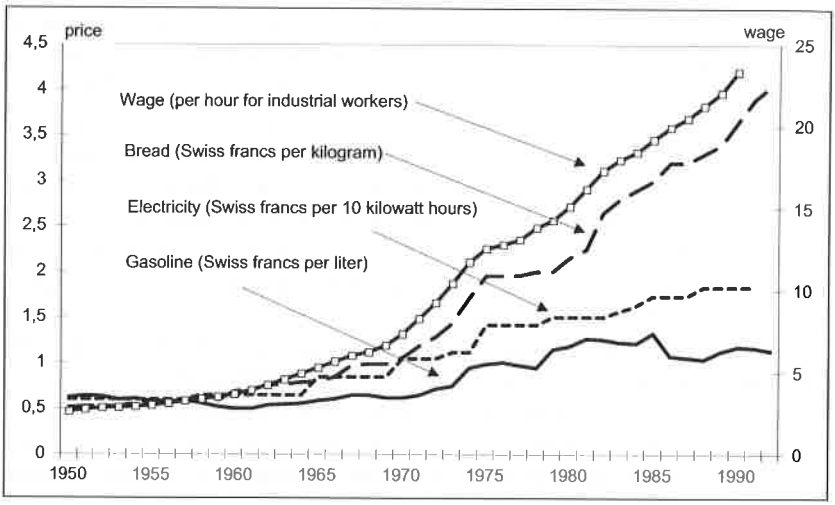

Fig. 5 Wages and the Price for Energy in Switzerland

Source: Pfister 1995.

Environmental concern and environmental policy

Taking all the evidence into consideration, it can safely be concluded that global energy consumption will not fall due to moral appeals. A change in behavior will occur only with an institutional change such as the introduction of an ecological tax system, the implementation of emissions certificates or other such incentive schemes. They and other institutions could change behavior by discouraging environmentally harmful consumption and rewarding ecologically friendly behavior. However, at least in democratic societies, change in laws and institutions requires the political will of the voters. In this regard, citizens' environmental concern plays a central role in determining environmental behavior.

Environmental concern plays a role in elections and can shape political platforms and the agendas of other organizations. This is true even though a strict application of rational choice theory to voting behavior predicts that individuals will not participate in elections since it is extremely unlikely that a single vote will

have any effect on their outcomes (Riker and Ordeshook 1968). However, voting is a perfect example of low-cost behavior. Because it does not cost much to participate in elections, individuals participate due to "soft" incentives such as norms and values (Riker and Ordeshook 1968, Blais and Young 1999). The sum of many low-cost decisions may in fact create high-cost consequences for others. A good example of such a social process is the boycott of the Shell company initiated by Greenpeace as a reaction to the company's plan to sink the Brent Spar oil platform into the North Sea. The boycott of Shell was almost costless to individual automobile drivers. All they had to do was to pass up Shell gas stations in favor of another supplier. However, the individually almost costless decisions had costly consequences for Shell. A consumer boycott can be very harmful to a company's bottom line, so companies are generally concerned with keeping an environmentally friendly image. Companies that are subject to the decisions of millions of environmentally concerned consumers have an incentive to invest in a positive ecological reputation through ecologically friendly behavior.

Environmental concern may also be of some importance for environmentally responsible behavior at an individual level, such as recycling activities. However, the issue of greater importance is the impact of environmental concern on the economic and political sphere through voting, support of ecological movements and NGOs, as well as through consumer decisions to exert the necessary political pressure on organizations to effect institutional change.

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