

Climate Change from International Perspective – Images of Nature as Cultural Background for the Acceptance of Protection Measures

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Summary

The study to be presented focuses on psychological factors which influence people's acceptance of measures to protect the climate, such as ecological taxing. An integrated psychological action model is used to analyse how people perceive and evaluate climate change and what they think of the protection measures. The relevant theoretical constructs are measured in a survey study with 588 students from the India, USA, Peru and Germany during the summer 2002. Results show that there are differences between people from different countries in the perception and acceptance of measures. However, national affiliation in itself is not a satisfying explanation for those differences. Therefore, it has been explored whether images of nature are culture-specific and whether they are linked to appraisals of climate change. Different types of perception of nature have been identified and are connected to the appraisals of climate change. Results show that basic beliefs about how "nature works" indeed explain differences in the perception of climate change and the acceptance of protection measures. These images of nature are presented in some detail as well as some empirical findings for the components of the integrated action model.

Introduction

Within research for sustainable development we try to understand the dynamics, causes and effects of world-wide changes in the natural environment. An important basis to understand and also to change such processes is the often underrepresented social dimension of sustainability: What is the social and cultural embedding of phenomena of global change? What do these phenomena mean for different people all over the world? Do we have the same understanding, perceptions and evaluations of global change? –

This project focuses on the perceptions and the appraisals of climate change as an exemplarily selected phenomenon of global change processes.

On the basis of an integrated psychological action theory, those factors are identified that hinder or foster the acceptance of protection measures, in particular, ecological taxing. The integrated action model covers components from the theory of planned behaviour by Ajzen (1991), the protection-motivation theory by Rogers et al. (1997) and the norm activation model by Schwartz (1981). The theoretical background is not discussed in detail in this paper (see Krömker, in press, for more details). For the actual purpose it is sufficient to mention that the integrated action model includes components that cover the perception of climate change on the one hand and that cover beliefs about the protection measures on the other hand. In such a way comprehensive insight into the relevant cognitions can be gained that influence the acceptance of the measures.

Methodology

The study has been done with a total of 588 students from four countries which represent quite diverse cultural backgrounds: India (Bangalore), Peru (Lima), USA (San Diego) and Germany (Kassel). The students were invited to fill in a questionnaire distributed by cooperating research partners from the respective university. Unfortunately, no representative sample for each country could be analysed, mainly due to financial restrictions. However, students are a relevant sample group because it could be assumed that they are potential future decision makers and potential trend setters of the ways of dealing with climate change.

The characteristics of the sample are presented in Table 1.

		Total Sample n =467-588¹	India n = 184	Peru N = 158	Germany n = 150	USA N = 97
Age	M (SD) Min / Max.	22.38 (5.29) 16 / 60	22.21 (4.8) 17 / 58	19.61 (2.74) 16 / 44	23.84 (6.29) 19 / 60	24.62 (5.64) 17 / 49
	<i>Up to 20 years</i>	36.7 %	38.0 %	63.3 %	18.7 %	18.6 %
	<i>21 – 30 years</i>	50.9 %	51.1 %	24.7 %	67.3 %	67.7 %
	<i>31 – 60 years</i>	5.6 %	4.9 %	0.6 %	8.7 %	10.4 %
Sex	Male	37.2 %	52.7 %	29.7 %	44. %	9.4 %
	Female	58.2 %	42.9 %	60.8 %	54.7 %	88.5 %
Studies	Social Sciences	45.2 %	25.9 %	63.3 %	38.0 %	58.3 %
	Technical Studies	17.5 %	31.0 %	24.7 %	6.7 %	4.2 %
	Natural Sciences	29.8 %	38.0 %	0.6 %	50.7 %	29.2 %
	Not identified	1.2 %	6.0	11.4	5.3 %	8.3 %
Children	Yes	9.9 %	8.7 %	1.9 %	7.3 %	29.2 %
	No	85.2 %	87.0 %	88.6 %	90.0 %	68.8 %
Religion	Christ	49.3 %	7.6 %	70.9 %	69.3 %	62.5 %
	Buddhist	2.9 %	6.0 %	2.5 %	0.7 %	1.0 %
	Muslim	1.4 %	3.8 %	-	- %	1.0 %
	Hindu	23.8 %	75.0 %	0.6 %	-	1.0 %
	Jew	0.7 %	0.5 %	1.3 %	-	1.0 %
	Other	1.9 %	1.1 %	3.2 %	-	4.1 %
	No	14.5 %	1.6 %	12.7 %	26.0 %	24.0 %

¹ Variation in number is given through missing answers

Table 1: Socio-demographic characteristics of the sample

The components of the model

All components considered in the study have been measured with statements presented in a questionnaire. For all statements, the degree of accordance could be ticked off on a five point scale, ranging from “strongly disagree” to “strongly agree”.

Two kinds of protection measures have been of interest in this study. On the one hand, general measures such as strict laws for industry or unspecific higher taxes were presented in the questionnaire. On the other hand, a very specific scenario about an income-neutral ecological taxing was presented. In the specific scenario, a concrete amount of money was proposed by which the prices for fossil fuels would be increased. The relevant measures are presented in Table 2. The implementation of the “acceptance” was done with a composed variable. It included statements about the commitment to the respective measures in public opinion polls, the willingness to support politicians in public opinion polls who are in favour

of such measures and the willingness to not undertake any action of civil protest such as participating in demonstrations.

General Measures	Specific Measure
<ul style="list-style-type: none"> •Strict laws which oblige the industry to reduce CO₂ emissions •Higher taxes on fuel, oil, electricity and other fossil energies •Self-commitments on a voluntary basis by industry to reduce CO₂ emissions •Strict laws which restrict the use of private cars/motorcycles and simultaneous encouragement of public transportation •Tradable CO₂ emission rights (firms or countries can sell their rights to other firms or countries, which are allowed to increase their CO₂ emissions by the respective amount; over time the number of tradable rights decreases) •Technical innovations which lead to a decrease in CO₂ emissions 	<p>Imagine, next month a law is passed which says that the taxes on petroleum, fuel oil, gas, etc. (i.e. all fossil energies) are raised by 10 Cent* every year, and that the state tax** is simultaneously reduced by about the same amount for compensation.</p> <p>* the price and unit was adapted to each country's currency and represented a rise in price of app. 5% based on the probably best known kind of fossil energy (e.g. fuel in the US and Germany) ** the kind of tax was adapted to each country's condition</p>

Table 2: The two kinds of measures to protect the climate presented in the study

Not all components used in the model to explain the acceptance of the measures (as independent variable) are presented here. However, the following selection encompasses factors that hinder and foster the acceptance of measures. Furthermore, the variables refer to the measures as well as to climate change. Among those factors that hinder the acceptance of measures and refer to climate change is the “avoidance” of the issue climate change, the belief it is caused naturally, and the belief it also has advantages. Among those factors that hinder the acceptance of measures and refer to the measures themselves is the belief that the costs and disadvantages of the measures are very high. Among those factors that foster the acceptance of protection measures and refer to climate change is the belief that it is a severe problem and has a lot of negative consequences. Among the factors that also foster the acceptance and refer to the measures themselves is the feeling of moral obligation to accept them and a positive attitude. Almost all factors consist of composed variables which are exemplarily presented in Table 3.

Construct	Exemplarily Statement
Avoidance	I avoid thinking about the issue climate change altogether
Caused naturally	Climate change is a natural process and is not caused by humans
Advantages	Climate change also has advantages because crops are growing better due to better weather conditions
Costs	Higher taxes or strict laws for climate protection would be negative because my personal freedom would be restricted
Moral Obligation	I feel obliged for moral reasons to accept such a law
Negative Consequences	Climate change endangers the future existence of humans
Attitude	Taken all together such a law is very positive, wise, important, progressive
Severity	The consequences of climate change are very severe

Table 3: Selection of constructs used in the study and implementation with statements

Results I: The perception of climate change and the acceptance of protection measures between the countries

In Figure 1, the average degree of accordance of the groups from each country is presented for each factor. In general it can be seen that the majority of the participants accepts the protection measures. Also, it is obvious that those factors that foster the acceptance have higher degrees of accordance than those that hinder the acceptance. Furthermore, the figure shows that there are differences in the perception of climate change, the evaluation of the measures and consequently in the acceptance of measures between people from the four countries (the overall differences are significant with $p < 0.5$).

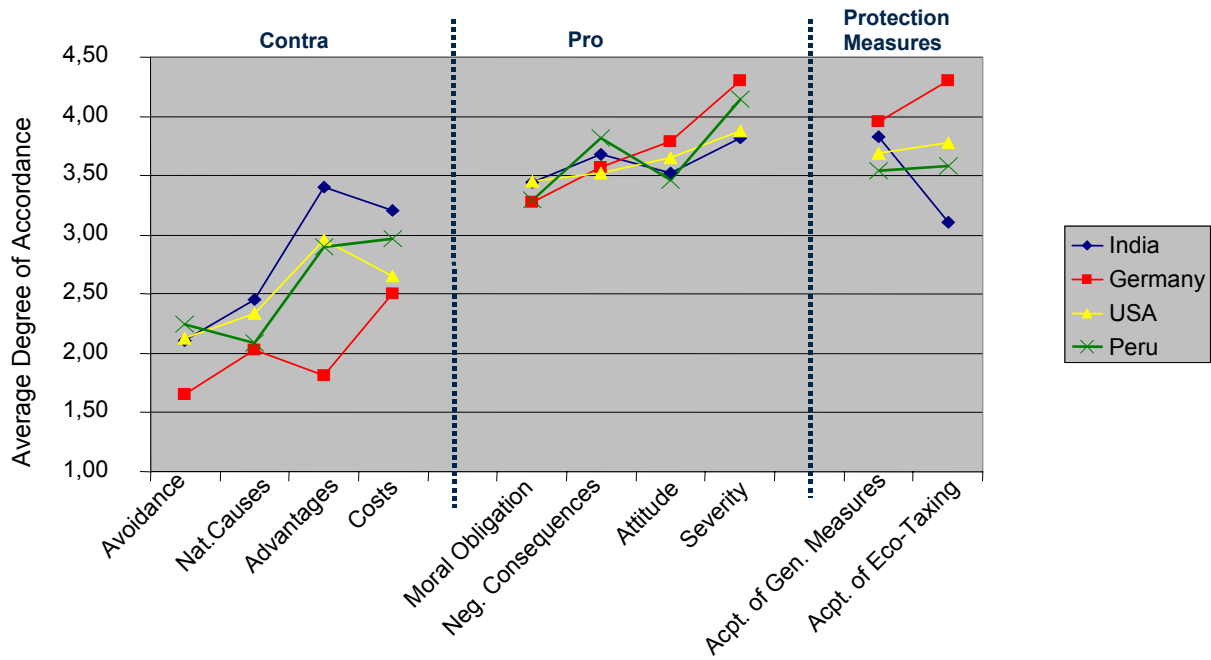


Figure 1: The Perception of climate change and the acceptance of protection measures between the four countries

The acceptance of the general measures is highest among the German participants, followed by those from India and the US and is lowest among the students from Peru. The acceptance of the taxing scenario is also highest among the interviewees from Germany, followed with some distance by those from the US and Peru. It is lowest among the participants from India. The reason for this is explained by the influence of the hindering and fostering factors also depicted in Figure 1. Their interplay is analysed with structural equation analysis in the already mentioned integrated action model (see Krömker in press). For example, it can be seen in Figure 1 that the perception of the severity of climate change is highest for the German group followed by that from Peru and is lower for the participants from the US and India. Whereas the perception of negative consequences is highest for the students from Peru, followed by those from India and is lower for those from Germany and the US.

Looking at the hindering factors, it can, for example, be seen that the participants from India and Peru agree to a higher degree that the measures have costs and disadvantages, compared to the participants from the US and Germany. Students from Peru have the highest scores on “avoidance” followed by those from the US and India, whereas participants from Germany have the lowest scores. In summary, there are differences between the groups from the different countries. However, there seems not to be an obvious trend towards acceptance or

non-acceptance, perhaps with the exception of the German respondents who always tend to be in favour of the protection measures.

The question now is how these results can be interpreted. The differences in the perception of the measures' costs for instance may reflect the different economic status of the countries. But why, for instance, do the participants from the US and Peru have similar scores for the perception of advantages, whereas in the perception of severity, people from Germany and Peru are similar? Or, why do the scores for participants from India and the US resemble each other when it comes to the belief that climate change is caused naturally?

Obviously, nationality in itself is not a very satisfying explanation principle. Variables or contents that lead to these differences are always needed for an explanation. Such variables could be, for example, a specific economic or political situation, worldviews, religion or culture which, in turn, probably subsumes many of the previous components. It is very plausible that nationality is related to culture to a certain extent. That is why quite different countries have been chosen for the study. Still, it seems too easy to treat nationality and culture as the same thing. Since not all inhabitants of one country are the same. It is probably too coarse to put all people of one society in only one category just because of their nationality. This would ignore the plurality of societies in terms of religion, life styles, demographics, income, education, etc.. Consequently, the existence of plural cultural subgroups within one nation should also be considered with respect to the perception of climate change. The idea in this study is to check whether *images of nature* might be a suitable cultural background because i) they have explanatory power with respect to the perception and evaluation of climate change, and ii) they take into account subgroups within one nation.

Images of Nature

Images of Nature are complex patterns of the daily life understanding of nature and its relationship with humans. This is possibly of relevance for the issue of climate change because climate is part of "nature". Climate change with all its material and chemical implementations takes place in the "natural sphere" (WBGU, 1993). Furthermore, it is discussed in many social science disciplines such as history or anthropology, that ideas about the functioning of nature are linked to culture (for instance: Großklaus & Oldemeyer, 19983;

Schlehe, 1996;). Further, culture is relevant for problems of global change because a solution cannot be found within one country only. The link to culture becomes visible if the historical changes in scientific or popular writing about nature within one region are analysed. For instance, in many European regions the view on nature changed from the early medieval times to nowadays. In early medieval times nature was rather feared. It was predominantly considered as a fallen nature (*natura lapsa*) as a symbol for humans' sins. It was kept alive by the mercy of God and could not possibly be destroyed by humans. Later, the idea predominated that nature was a product God's great power and wisdom. It was admired for the wonder of a perfect natural household (*oeconomia naturae*) created by God. In these times nature was started to be studied, calculated and measured by "natural researchers" in order to demonstrate the infinite wisdom of God. Also, the idea that this creation of God could be destroyed by humans remained barely thinkable (Sieferle, 1989). With the appearance of ecology as a sub-discipline of biology in the beginning of the 19th century, the idea of humans as a disturbing factor in the natural system started to predominate. In addition, the necessity to refer to nature as God's creation diminished with time.

Many other aspects of thinking and talking about nature can be analysed. For instance, the aesthetical perception of landscapes changed. Before romanticism, landscape as such was not discovered, and only beginning in the late 18th century, landscape was experienced as an aesthetic event. To illustrate this change in aesthetic perceptions exemplarily, two descriptions of the "Lüneburger Heide", a national park in North-West Germany, are presented in Table 4. Probably the landscape looked quite similar at the time of the two descriptions, although the narrative appears as if two completely different areas were described.

Not only within the historical changes of one region, but also between different places of the world are the ideas about nature quite different. To cover this, only keywords can be named in this paper such as animistic cultures, native Indian cultures or the "all-unity" idea of Buddhism. For instance, nature in these cultures is regularly not considered as a "counter"-part to humans as we know it from European cultures. In European cultures, we generally think of nature vs. culture, nature vs. technology, etc..

Lüneburger Heide, Caroline Schlegel, 1801	Lüneburger Heide, „Leisure Guide“, 2000
The hurry was the best thing of the journey, because - for heavens' sake! What a country! I got sick from this uniform bleak view on the heather and on the sky... And like this it went on and on. Never ending meagre brown heath, sand, crippled trees, covered with moss and must.	The region offers fascinating natural spectacles and vast areas of charming and silent heath. It tempers with it's special diversity of plants and animals and furthermore offers a lot of interesting activities to do in your leisure time.
This landscape is known as: wild, noisome, desert, awful, bleak, evil	This landscape is known as: beautiful, recreative, relaxing, fascinating
Cited from: Eichberg, 1983, p.197 (own translation)	Cited from: Landgrebe, & Reifenhause, 2000, p.130,137 (own translation)

Table 4: Two descriptions of the same landscape at two different points in time

There are, however, only very few studies in which the perceptions of nature are analysed with quantitative methods (e.g. Thompson, 2000; Dunlap et al., 2000) and in different cultural backgrounds. This was one aim of this study. For this purpose, statements about nature were presented in the questionnaire which were to be evaluated on the given five point scale. The statements were derived mainly from a broad body of mostly qualitative literature but also taking into account the few available quantitative studies (e.g. Bayerl, 1989; Großklaus & Oldemeyer, 1983; Sieferle, 1999; Rink & Wächter, 2001; Stüben, 1995; Valsangiacomo, 1998). With the help of factor analysis eight factors relevant for the actual perception of nature were identified. These factors include whether nature exists as a purpose for human needs, whether it should be treated with respect, whether it needs and deserves to be protected, whether it is spiritual, whether it is threatening, whether it is tolerant with human interferences and whether it is a limited resource. The factors consist of composed variables. The relevant statements are exemplarily presented in Table 5.

It was, however, not only the aim to identify the single aspects (factors) of the perceptions of nature. It was mainly the aim to identify patterns of those aspects, i.e. the images of nature. In order to do so, a cluster analysis was carried out with the above mentioned factors. With cluster analysis, groups can be identified whose members have similar scores in the perception of each single factor.

Construct	Exemplarily Statement
Purpose	Plants and animals do exist primarily for human use *
Robust	Nature is not that fragile that it has to be protected by humans. It can best help itself
Respect	Whatever humans take from nature they must give back in order to keep the balance of the universe
Needs & Deserves to be Protected	Nature should be protected because it enriches our lives by its wonderful magnificence
Spiritual	Nature is spiritual or sacred in itself **
Threatening	Many processes of nature are dangerous to humans
“Perverse/Tolerant”	To some degree humans can modify nature. Nature gets out of control only if a specific threshold is overstepped ***
Limited	The earth is like a spaceship with only limited room and resources *
source: * based on Dunlap & Van Liere, 1978, p.13; **cited from Gardner & Stern, 1996, p.4; *** based on Kuckartz, 2002,p. 56, based on Cultural Theory	

Table 5: Constructs and statements of the perception of nature

Results II: The images of nature in the sample

Figure 2 depicts the results of the cluster analysis. Four groups could be identified and differentiated significantly for each factor. The coloured areas represent the pattern of the average scores on the five point scale for each factor. At first glance, it can be seen that the shapes of the areas are different. They visualize the different patterns of perceptions of nature: the images of nature.

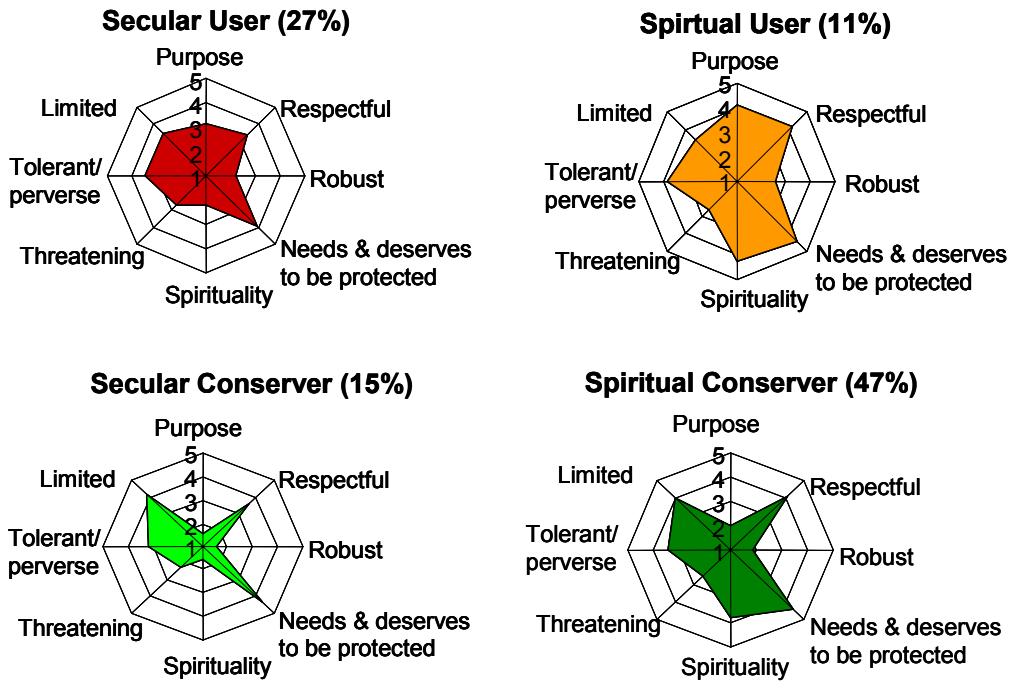


Figure 2: Four images of nature and the average scores for the relevant beliefs about nature

The biggest group, the “spiritual conserver”, encompasses 47% of all participants in the study. The members think that nature does not exist for human purposes, that nature should be treated with respect, that it is not very robust, that it definitely needs and deserves to be protected, that it is not very threatening and that natures’ resources are limited. The smaller “sister group” is quite similar in these beliefs. However, it’s scores are more extreme in all factors. Especially the groups are different in the beliefs about nature’s spirituality. In the smaller group the members, on average, do not think that nature is very spiritual. Therefore, they are labelled the “secular conserver”. These differences are visualized in Figure 3 where the patterns for each type are integrated into one net-diagram. Also, in this figure, it becomes clear that the two user groups think that nature mainly exists for human purposes, that it is more robust, more threatening, more tolerant with human interferences and that nature is not very limited, compared to the conserver groups. The second biggest group are the “secular users” and the smallest group are the “spiritual users”. They are also different with respect to spirituality as can best be seen in Figure 2.

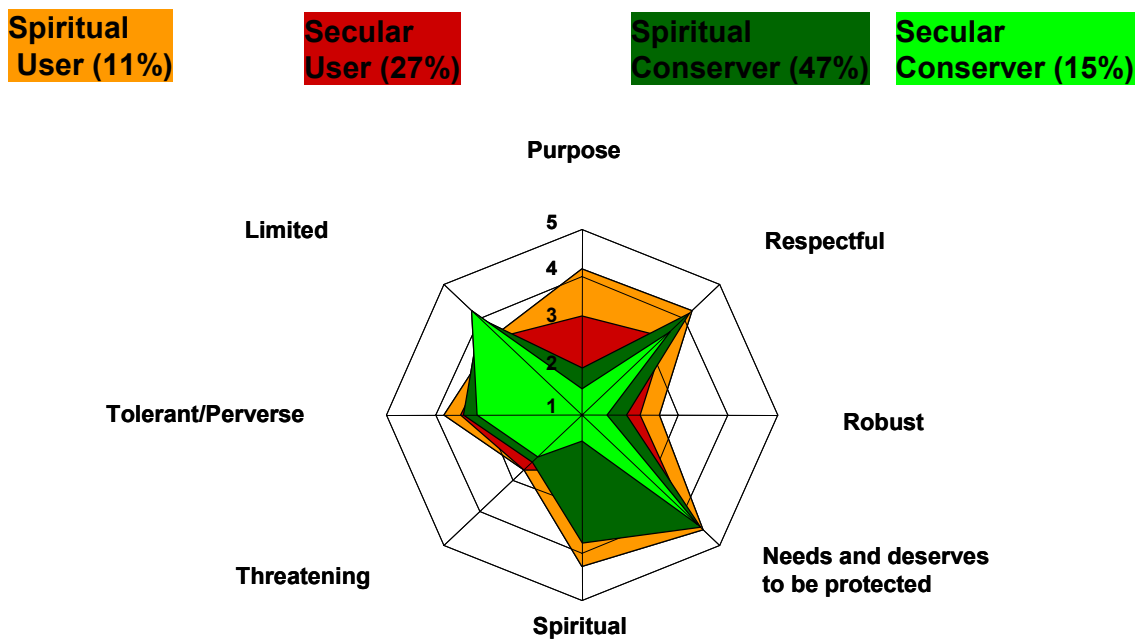


Figure 3: Comparison of the four images of nature

Now it is interesting to analyse how these images of nature are distributed among the nationalities of the interviewees. The results are depicted in Figure 4.

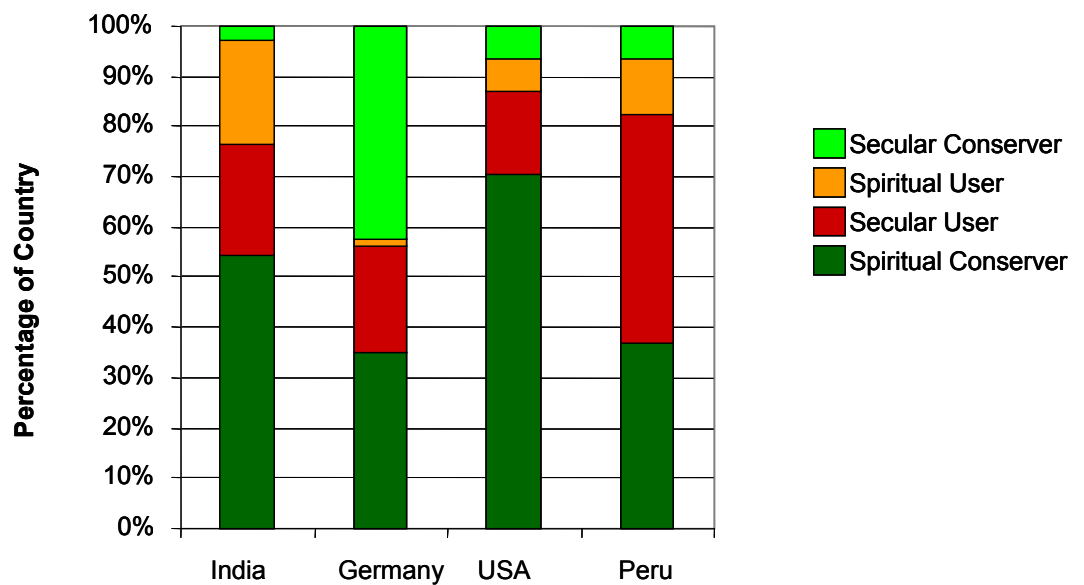


Figure 4: Frequency distribution in percent of nationality to the images of nature

It can be seen that the frequency distribution (in percent) for each image of nature is different for each country. Each country contributes to the biggest group of the “spiritual conserver”. However, the big majority of the US participants (71%), followed by those from India (54 %), prefers this image. The “secular users” are mostly preferred by the respondents from Peru (46%), whereas the “spiritual users”, quite a small group, are - if preferred at all - mostly chosen by Indian participants (21%). Similarly, the smallest group, the “secular conserver”, are - if at all - preferred by German respondents (42 %). This supports the idea presented above that there seem to be typical images of nature for each nation. They seem to be dominant for that “culture”. However, it is also important to think of plural relationships with nature within each nation.

Results III: The perception of climate change and the acceptance of protection measures between the images of nature

The important question in this study is whether the above identified images of nature can explain different perceptions of climate change. Therefore, it has been tested whether there are differences in the scores for the climate change variables introduced in the beginning for each different image of nature. The results are depicted in Figure 5. It becomes clear that, indeed, there are clear differences between the four images of nature with respect to perceiving and evaluating climate change. In general, the user groups on the one hand and the conserver groups on the other hand have similar scores. The users have higher scores on those variables that hinder the acceptance of protection measures and lower scores on those that foster the acceptance. Consequently, their acceptance is lower for both the general measures and the specific eco-taxing scenario. In contrast, the conservers have lower scores on the hindering factors and higher scores on the fostering factors. Consequently, their acceptance for protection measures is higher.

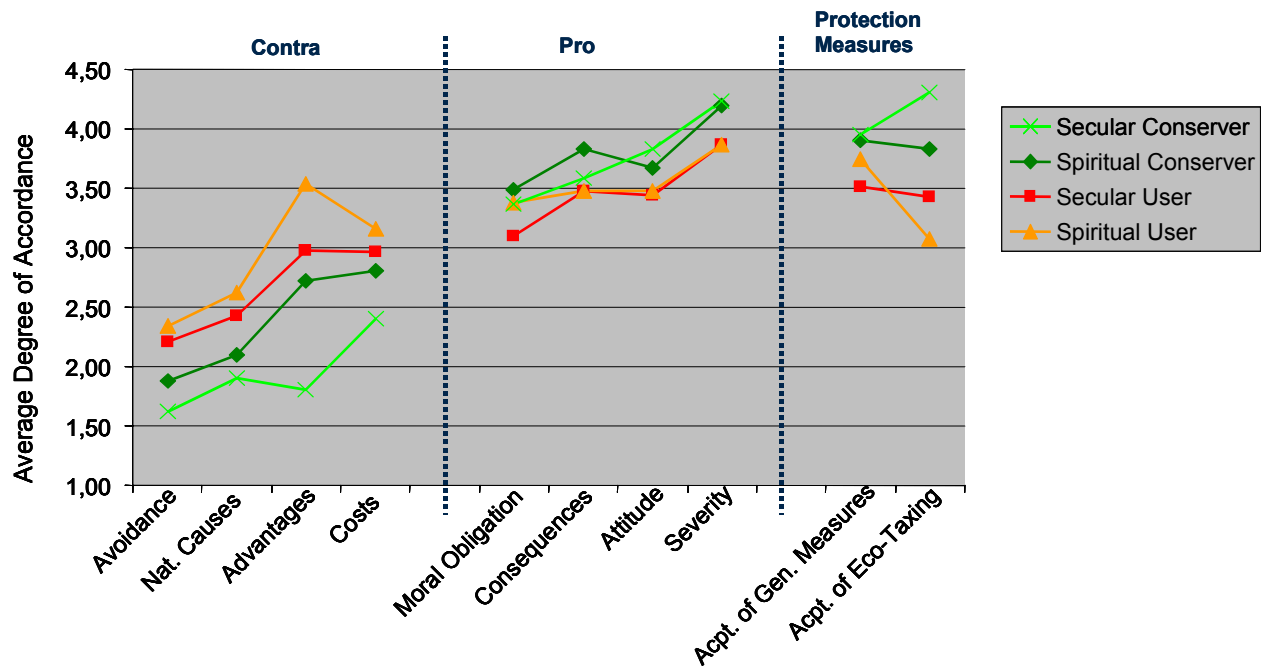


Figure 5: The Perception of climate change and the acceptance of protection measures for the four images of nature

Discussion

In this study, it has been shown that there are differences in the perception and evaluation of climate change and the acceptance of protection measures between people from different countries. Such differences are important, for instance, in order to understand the difficulties in the international negotiations process for the Kyoto-Protocol. Only if it is known why people do or do not accept the relevant measures, can strategies be developed to support the acceptance. In this study, it also became apparent that principle ideas about nature, i.e. the images of nature, influence how people deal with a selected phenomenon of global change. These images of nature might reflect to a certain degree the cultural embedding of the understanding of human-environment interactions. It is possible that the images of nature also influence how people deal with other problems such as loss of biodiversity. Thus, images of nature might be a general cultural background variable for many related problems. Consequently, the ideas about nature should be taken into account when it comes to searching for strategies that could change social behaviour.

Clearly, it is an open question for further research whether the results of this study are replicable in a broader sample for each country. The images of nature in this study were developed with a student sample. It would be very desirable to test whether these images do

also fit for other subgroups of a society such as, for instance, decision makers, industrial workers, farmers or others. Furthermore, not all relevant aspects of each subculture may have taken into account in these images of nature. It is possible that important aspects are missing. It would, thus, be necessary to add more qualitative methods in the future research on images of nature. Especially qualitative methods, such as open interviews, allow to overcome the restrictions of quantitative methods such as questionnaires. For instance, it is very likely that participants from India, who come mostly from a Hindu background, associate different meanings with “spirituality” than people from Germany do. What this means can only be found out with detailed interviews and with a closer cooperation with researchers from the respective “culture”.

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