



International Institute for
Applied Systems Analysis
www.iiasa.ac.at

Environmental Concern and Environmental Action in Western Europe: Concepts, Measurements, and Implications

Sprinz, D.

IIASA Working Paper

WP-90-014

March 1990



Sprinz D (1990). Environmental Concern and Environmental Action in Western Europe: Concepts, Measurements, and Implications. IIASA Working Paper. IIASA, Laxenburg, Austria: WP-90-014 Copyright © 1990 by the author(s). <http://pure.iiasa.ac.at/id/eprint/3437/>

Working Papers on work of the International Institute for Applied Systems Analysis receive only limited review. Views or opinions expressed herein do not necessarily represent those of the Institute, its National Member Organizations, or other organizations supporting the work. All rights reserved. Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage. All copies must bear this notice and the full citation on the first page. For other purposes, to republish, to post on servers or to redistribute to lists, permission must be sought by contacting repository@iiasa.ac.at

WORKING PAPER

Environmental Concern and Environmental Action in Western Europe: Concepts, Measurements, and Implications

Detlef Sprinz

March 1990
WP-90-014

**Environmental Concern and
Environmental Action in Western Europe:
Concepts, Measurements, and Implications**

Detlef Sprinz

March 1990
WP-90-014

Working Papers are interim reports on work of the International Institute for Applied Systems Analysis and have received only limited review. Views or opinions expressed herein do not necessarily represent those of the Institute or of its National Member Organizations.

INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS
A-2361 Laxenburg, Austria

Author

Detlef Sprinz is currently associated with the Department of Political Science, The University of Michigan, 5602 Haven Hall, Ann Arbor, MI 48109-1045, USA.

Preface

Public perception and attitudes are important factors in gaining support for programmes of reducing air pollution. Detlef Sprinz, as part of the 1989 Young Scientists Summer Program at IIASA, examined how public attitude about air pollution varies among countries in Europe, and what factors govern environmental concern.

R.W. Shaw
Leader
Transboundary Air Pollution Project

B.R. Döös
Leader
Environment Program

Table of Contents

Abstract.....	i
Acknowledgements.....	i
1. Introduction.....	1
2. Previous Findings.....	1
3. Major Sources of Environmental Attitudes.....	3
4. Data Sources and Operationalization.....	4
5. A First Explanation: The West European Aggregate.....	6
6. A Closer View: Country-Level Explanations.....	8
6.1 Comparison of Parameter Estimates Across Countries	8
6.2 Individual Evaluation of Each Polity.....	9
7. Comparison of Our Results With the Study by Rohrschneider	11
8. Conclusions.....	12
Bibliography.....	15
Figures.....	17

Abstract

In modeling mass public attitudes towards the environment in Western Europe three hypotheses were tested: (i) Does problem pressure, i.e., the extent of exposure to pollution, or (ii) the emergence of postmaterialist values in advanced industrial societies, or (iii) social class explain the degree of environmental concern and environmental action in Western Europe? The author employed a Linear Structural Relations (or LISREL) model to test the hypotheses with data drawn from Eurobarometer 18. The findings show that, if we want to explain environmental concern, exposure to pollutants is the dominant explanatory variable. They also show, that if we wish to explain environmental action, the impacts of postmaterialism and social class are likely to prevail. Further research comparing results from Eurobarometer 18 data with Eurobarometer 25 data will investigate the intertemporal reliability of the research findings.

Acknowledgements

The original idea of comparing environmental attitudes among the Western European countries was born during a seminar on Western European politics at the University of Michigan in early 1988. Together with Gerald Wagner, the author developed alternative explanations of environmental attitudes in Western Europe and put them to a preliminary test using path-analysis. Gerald Wagner returned to West Germany soon thereafter. The current paper still owes many insights to the earlier cooperation and the fruitful theoretical discussions. Since then, the author has changed the measurement and estimation of the model considerably by using a linear structural relations approach.

The author is indebted for helpful criticism from his classmates in Political Science 642, the participants of the 1988 and 1989 Annual Columbia Graduate Student Conferences on Western Europe, Frank Andrews, Samuel Barnes, Joanne Brzinski, Miriam Green, Ronald Inglehart, Roy Pierce, Larry Selinker, and Eva Stahlheber. Laura Klem provided valuable statistical support. The usual caveats apply. The Political Science Department at the University of Michigan provided generous computational funding as well as financial assistance through the Rackham Dissertation Scholarship. Funding in the final phase of writing was generously granted by the West German Association for the Advancement of the International Institute for Applied Systems Analysis (IIASA), Jülich, and by the director of IIASA, Dr. Robert Pry.

The data utilized in this article were made available by the Inter-university Consortium for Political and Social Research, Ann Arbor. The Eurobarometer 18 data were originally collected by Jacques-René Rabier, Helene Riffault, and Ronald Inglehart. Neither the original collectors of the data nor the Consortium bear any responsibility for the analyses or interpretations presented here.

1. Introduction

As a consequence of the 1972 UN Stockholm Conference on the Human Environment, environmental citizen action groups developed in most Western European nations as an answer to the challenges of the adverse effects created by industrialization. As a correlate of this, environmental concern arose among the elites as well as the mass public in most polities. This study will shed more light on those factors which mobilize mass publics in favor of the environment.

On the one hand, early US research on "environmental concern" was centered around the construction of scales and the construction of models that explain its variation. On the other hand, some research in Western Europe, especially in the FRG, has focused primarily on data gathering. Some authors had explained a high degree of environmental concern as being caused by high exposure to environmental pollution, while other research emphasizes the effect of value change in advanced industrial societies on environmental concern. The latter explanation suggests that post-materialism is strongly associated with environmental concern in the post-1970s. In addition, research has concentrated on the question of whether highly concerned individuals are willing to make economic sacrifices in favor of the environment.

In Section 2, we report prior research findings. These are followed by a section on the research hypotheses explored in this study (Section 3). Section 4 addresses questions of operationalization and measurement, while Section 5 reports first results from an aggregate estimation for all members of the European Communities. A closer look at a subset of four countries (Section 6) is followed by a comparison of our findings with a related study (Section 7). Section 8 concludes with a summary of our findings, suggests future avenues of research, and places our findings in the context of public policy.

The following section will review the state of research as is relevant to the research design introduced in Section 3.

2. Previous Findings

In research on the environmental attitudes of mass publics, Hagstotz/Kösters (1986) have demonstrated for West Germany that if an individual is *personally* affected by the environment in a negative way, *general* concern for the environment at large will be high.¹ However, the opposite does not hold true (ibid., 349). In our analysis, we will place

¹ Personal concern reflects a person's attitudes to his/her immediate environment ("exposure to environment") whereas general concern represents a person's attitudes towards a larger geographic area ("environmental concern").

emphasis on the positive link between personal and general concern for the environment and label it the "problem pressure" hypothesis.

A second debate centers around the importance of social class which is traditionally operationalized as the triad of income, education, and job occupation. The extent to which each of these predictors substantially contributes in assessing environmental concern differs from study to study. Income and education are found to vary positively with environmental concern (Tucker 1978, 405; Buttel/Flinn 1978a; Van Liere/Dunlap 1981).

As a third issue, we might face a middle class syndrome, as explicated in the work on the theory of postmaterialism (Inglehart 1977, 1990). In the context of environmental attitudes, the emergence of environmental concern may be a consequence of broad mass belief systems that emerged during the last two decades in advanced industrialized countries. Therefore, environmental concern does not necessarily reflect objective changes in the state of the environment in recent years; instead, environmental concern may be a result of a desire for leaving the environment intact. This has lead postmaterialists to support citizen action groups which promote an ecologically sound economy.

Another contribution to the debate of class versus value change in explaining environmental attitudes is the analysis by Beck (1986), who focuses on the differences of exposure to hazards. Environmental risks, like exposure to air pollution or industrial waste, are results of the production of prosperity. In modern industrial societies we are confronted with both material affluence and abundance of environmental risks. Beck's central question is: *Where* in society are these environmental risks concentrated, i.e., which social stratum suffers most from environmental pollution? He draws a picture of today's highly industrialized societies in which material affluence is distributed *relatively equally* compared to various kinds of environmental risks which are *concentrated at the lower stratum*. Therefore, one may expect to find higher direct exposure to environmental risks among the low socioeconomic stratum rather than among the high stratum.

Research in the United States gives partial answers to Beck's propositions. It can be hypothesized that lower class status is likely to covary positively with disadvantageous environmental conditions *and* a lack of secure income. Because of preferences for materialistic over postmaterialistic values, one might expect that the working class would show less concern. In his analysis, Tucker (1978) compared the attitude of female members of the "Sierra Club" and the "Audubon Society" with females in the general public. He clearly found a positive correlation of higher social status with the degree of environmental concern. Tucker asserts that (i) environmentally concerned persons are likely to be members of environmental groups and that (ii) club membership varies positively with socioeconomic status. Contrary to Tucker's finding, Buttel/Flinn (1978)

concluded that environmental *awareness*² does not covary with class. However, they found that environmental *reform*³ is stratified by social class. Since reform measures may be a greater danger to the jobs of blue collar workers than to those of white collar workers, the finding is not surprising.

In trying to explain support for environmental reform measures and, more broadly, environmental action, we find that the education variable matters. These findings add credibility to the argument that doubts the usefulness of *combining* education, income, and occupation for explaining the impact of class on environmental concern. In research on the effects of environmental concern, some studies have focused on the impact of environmental concern on environmental action behavior (Kessel/Tischler 1984, 31). This includes recycling, assistance in litter pick-up and signing petitions in favor of environmental projects. Weigel/Weigel (1978) found a positive relation between concern and action (ibid., 11). We therefore conclude that it is not only problem pressure which leads to higher environmental concern but (i) postmaterialism and (ii) social class also covary positively with environmental concern. In addition, the latter two variables are also expected to be positively associated with measures of environmental action.

This review of the literature revealed the importance of a number of concepts in explaining environmental attitudes, i.e., perceptions of the state of the environment, value preferences, class variables, and preparedness for environmental action. Our goal in this paper is to develop a model which explains environmental concern and links it to environmental action behavior, using variables identified in previous studies.

3. Major Sources of Environmental Attitudes

In this study we will evaluate four competing hypotheses. The first suggests that exposure to environmental hazards leads to high environmental concern. Second, social class is expected to covary positively with environmental concern and environmental action. The third hypothesis claims that post-materialism shapes the degree of environmental concern and environmental action. Fourth, the higher the environmental concern the higher a person will score on preparedness for remedial action (or environmental action) (see Figure 1 for the basic structure of the argument).

Specifically, the hypotheses can be related to the literature as follows:

² We will call this the perception of "exposure to pollution" and equate it with Hagstotz/Kösters' (1986) "personal concern".

³ We will use the term "environmental action" in our analysis.

First, exposure to (environmental) pollution ("problem pressure") leads people to develop a high degree of concern for the environment (Hagstotz/Kösters 1986). This applies, for example, to persons whose occupations expose them to environmental hazards. However, one cannot be sure of the exact impact of a hazardous environment on the development of environmental concern. On the one hand, persons of low socioeconomic status (i.e., individuals who are likely to hold positions with exposure to environmental hazards) may be too frustrated to show much concern with their environmental conditions since their primary goal may be to earn a secure income. On the other hand, the opposite can also be true: Living and working in a hazardous environment may lead to the conceptualization of the threat and, in addition, to interest in remedial action. In order to shed more light on the importance of social class, we decided to include it among the set of independent concepts. From the literature surveyed in Section 2, we pursue the second hypothesis which relates social class with all of the other independent and dependent concepts. According to Beck (1986), we should expect a negative relation between the independent concepts (i) social class and (ii) exposure to pollution, whereas Buttel/Flinn (1978) suggest no substantial covariation between the same concepts. Furthermore, the findings of Tucker (1978) lead us to hypothesize a positive association between social class and environmental concern while Buttel/Flinn (1978) would emphasize a positive relation between social class and environmental action.

For our third hypothesis, the case can be made that in societies which are characterized by an affluent middle class, white collar workers are aware of the environmental challenge to the whole of society *even if they are not affected by adverse exposure to pollutants*. Such altruistic perception of the state of the environment by postmaterialists (Inglehart 1977; 1990) would lead to an increase in the magnitude of environmental concern and environmental action independent of exposure to pollution.

Fourth, following the suggestion of Weigel/Weigel (1978), we expect environmental concern to be positively linked to environmental action.

4. Data Sources and Operationalization

The data used in my analysis come from the so-called Eurobarometer survey, which has been conducted twice each year in the member countries of the European Communities. Eurobarometer 18, which specifically focused on ecological issues, was conducted in October 1982. Its primary focus (as relevant to our investigation) was to survey ecological problems at the local, national, and world level as they are viewed by the individual. These items were complemented by personal goal and life satisfaction questions, political orientation

items, and questions about the usual array of personal background variables (age, income, etc.).

To test our hypotheses in the context of Western Europe, we decided to use a linear structural relations model with latent variables (Jöreskog/Sörbom 1984, Hayduk 1987). This method allows us to test a measurement model for the underlying concepts,⁴ and it permits us to estimate the structural relations between latent variables.⁵ Our independent latent variables comprise "exposure to pollution" (problem pressure), "postmaterialism" (value change), and "social class". "Environmental concern" and "environmental action" will constitute the two dependent latent variables. As the literature suggests, environmental concern serves as an intervening concept for the impact of the independent concepts on environmental action (see Figure 1).

Exposure to pollution was operationalized as a combination of the individual's *subjective perception* of exposure to (i) noise, (ii) air pollution, (iii) lack of open space, (iv) loss of good farmland, and (v) damage to the landscape. The four-item battery for postmaterialism was chosen as the single observed variable to represent this concept (Inglehart 1977, 28). The age when the interviewee finished his or her full-time education was chosen as one indicator of social class; the individual's relative position in terms of income quartiles contributed a second indicator for this concept.⁶

The measurement concept for environmental concern consists of *concern* for the (i) country's river pollution, (ii) damage to sealife and beaches in one's own country, (iii) air pollution in one's country, (iv) disposal of chemical waste in his or her country, (v) the extinction in the world of some plants and animal species, and (vi) possible atmospheric damage affecting the world's weather (global warming).

Finally, the concept of environmental action⁷ was operationalized by a single indicator, the "pro-environmental index". This index combines the answers to two survey questions: (i) Preference for environmental protection *over* lower consumer prices, and (ii) priority of environmental goals *over* economic growth. The coding was established as follows: Two pro-environmental answers were coded as "three" on the pro-environmental index, one pro-environmental and one anti-environmental answer were coded as "two", and two anti-environmental preferences were coded as "one" on the index. Whenever the

⁴ In figure 1 through 5, concepts (or factors) are marked by ovals. The observed variables are put into rectangles. Arrows pointing from the factors to the observed variables are called "factor loadings." The unique variance is reported by the arrow entering the observed variable from the side opposite to the respective factor. Double-headed arrows between the independent concepts point to the degree of association among them.

⁵ The structural coefficients between the independent concepts and the dependent concepts are given by the one-headed arrows.

⁶ Since the ranking within prestige scales for job occupations may vary across countries, we omitted this observed variable.

⁷ In the figures, we referred to the concept as "environmental action 18" in order to indicate that the estimates are conducted with Eurobarometer 18 data.

original question offered an in-between option, this was coded as taking a stance *against* the environment.⁸

All observed variables were recoded so as to have the intuitive meaning, i.e., higher scores for exposure to noise are corresponding to a less attractive environment. Similarly, a positive structural coefficient linking (i) exposure to pollution to (ii) environmental concern is to be interpreted as "higher exposure leads to higher concern." In the following section we will use the West European aggregate to show the basic pattern of findings. In a subsequent section, we will focus on the performance of the general model in four countries: West Germany, The Netherlands, France, and the United Kingdom.

5. A First Explanation: The West European Aggregate

Our data for the European aggregate comprise samples from ten nations in proportion to their actual populations in the member countries of the European Communities.⁹ First, we will focus on the performance of the measurement concepts, and then we will turn to the estimation of the structural equations.

We decided to give each of the two single-indicator concepts a factor loading of .8 (see Figure 1). In the case of postmaterialism, the validity then turns out to be reasonably close to the actual performance of the indicator in prior studies.¹⁰ In the case of the pro-environmental index (the indicator for environmental action) we cannot rely on prior findings. A factor loading of .8 may, for our purposes, be understood as the upper boundary of the true validity.¹¹

⁸ Three strands of criticisms emerged. *First*, as one reader of a prior version of the manuscript argued, the relation between environmental action and environmental concern, on the one hand, *and* postmaterialism, on the other hand, is tautological. However, research by Ronald Inglehart has shown that the environmental variable of the 12-item materialist-postmaterialist battery does not point to either postmaterialism or materialism (Inglehart 1977, 46, figure 2-2). *Second*, another reviewer's criticism was that the macroeconomic goal of inflation control is part of the independent variable (postmaterialism) as well as part of the dependent variable (pro-environmental index). Detailed studies of the product moment correlation matrices which related both (i) the unrecoded variables and (ii) the recoded dependent variable to postmaterialism showed values no higher than .35. In most cases, we find correlation coefficients in the .20 to .30 range. *Third*, environmental action is not operationalized by *explicit* action variables, like recycling behavior, participation in demonstrations, etc. Since Eurobarometer 18 only includes preferences regarding tradeoffs between environmental goals, on the one hand, and macroeconomic variables, on the other, and since we expect these preferences to positively covary with a more truly environmental action concept, we stick to the terminology chosen.

⁹ The countries included are France, Belgium, The Netherlands, West Germany, Italy, Luxembourg, Denmark, Ireland, the United Kingdom, and Greece.

¹⁰ Personal communication with Ronald Inglehart (10 April 1989).

¹¹ The parameter reported in this article are the standardized coefficients reported by LISREL (Jöreskog/Sörbom 1984).

In the case of the measurement model for exposure to pollution, the factor loadings range from .56 to .76 for the European aggregate¹² (see Figure 1). The concept of social class shows validities of .44 for the variable income quartile and .67 for the age at which the interviewee finished his or her full-time education.¹³ The factor loadings for the environmental concern concept range from .66 to .80 in the West European aggregate; similarly high loadings are found for single country studies. Overall, the measurement model used in this analysis performs quite well on the aggregate level.

From our hypotheses, we expected strong positive coefficients for the relation between the three independent variables and environmental concern. That is, it was reasonable to anticipate that people with high exposure to pollution, postmaterialists, and persons of high socioeconomic status would be concerned with the environment. In addition, we expected the same to be true with the direct impact of social class and postmaterialism on environmental action. We also anticipated a strong positive relation between environmental concern and environmental action. The aggregate model accounts for 26% of the variance of environmental concern and 31% of the variance in environmental action. The following patterns did emerge from the analysis of the structural coefficients:

First, social class is strongly and positively related to postmaterialism. However, the other latent independent concepts are practically unrelated to each other.

Second, exposure to pollution is strongly and positively related to environmental concern and thus indirectly positively related to environmental action. However, the direct impact of exposure to pollution on environmental action, controlling for environmental concern (and all other variables), is mildly *negative*. Direct and indirect effects therefore have partially offsetting effects.

Third, postmaterialism shows a weak positive relation with environmental concern but maintains a strong positive direct link to environmental action, whereas higher social class is positively related to both environmental concern and environmental action. In addition, environmental concern has a strong and positive impact on environmental action.

Fourth, in terms of relative importance, exposure is the leading explanatory variable for environmental concern followed by social class and postmaterialism; environmental action is best explained by environmental concern, followed by social class, postmaterialism and exposure. In terms of our initial hypotheses we see that the

¹² All coefficients reported in this study are significant at the .05 level if *not* accompanied by an ***. Since most t-values and standard errors do not point to problems with significance levels, we decided to highlight the few parameters which fall short of statistical significance.

¹³ It has to be noted that the estimation of the factor loading of the education variable is not independent of the estimate of its unique error term (Pearson correlation coefficient of -.84). Similar problems occur with the country estimates. We decided to retain this variable for substantive reasons since the concept of social status is normally based on the triad of income, education, and occupational status, and we wished to avoid mono-operationalization of this concept.

hypotheses are complementary rather than mutually exclusive. Persons with high exposure have to be concerned with their environment *in order to consider* remedial action, whereas postmaterialists may be seen as altruists: They consider environmental action despite relatively low levels of concern. Social class has important direct and indirect effects on the dependent concepts.¹⁴

Looking at the whole set of structural relations permits us a differentiated picture of the complex explanatory pattern. The lack of conclusive research led us to estimate a *saturated* model over a more parsimonious model.¹⁵

In addition to the aggregate analysis we conducted four detailed country analyses in order to focus on the varying impact which political systems have on environmental attitudes.

6. A Closer View: Country-Level Explanations

In order to determine whether these aggregate relations hold for the West European polities, four major Western European countries were chosen: West Germany, The Netherlands, France, and the United Kingdom.¹⁶ Figures 2 through 5 support the adequacy of the measurement model. We will first compare the parameter estimates across countries and then give consideration to the idiosyncrasies of each country.

6.1 Comparison of Parameter Estimates Across Countries

Firstly, after we restrict our analysis to the three independent concepts of exposure to pollution, postmaterialism, and social class, Figures 2 through 5 show that postmaterialism is moderately related to class (with the exception of the U.K.). In West Germany, however, all three independent concepts are moderately related to each other.

¹⁴ If the concept of social class is omitted, postmaterialism shows much stronger links to environmental concern and environmental action. The hefty coefficient between the concepts of social class and postmaterialism gives us an indication of the impact of model specification on the magnitude of parameter estimates. We wish to thank an anonymous participant of the 1988 Annual Graduate Student Conference on Western Europe (Columbia University, New York) for insisting that social class be included in the analysis.

¹⁵ We accept the fit statistics as satisfactory and did not engage in introducing correlated errors. In this respect, the measurement model presented here remains parsimonious and easy to interpret.

¹⁶ The case selection was based on a priori expectations: For The Netherlands and West Germany, we anticipated environmental concern and postmaterialism to be of considerable strength, and we expected these factors to carry less weight for France and the U.K.

Second, environmental concern is best explained by exposure to pollutants in all of the countries, with West Germany constituting the exception. Here, postmaterialism was found to have a stronger impact on environmental concern than exposure to pollutants.

Third, with regard to the direct effects of the independent concepts on environmental action, postmaterialism was at least as good a predictor as was social class. In all of the four countries, exposure to pollution had no significant effect on environmental action, or the effect was found to be mildly *negative*. However, exposure to pollution is the only independent concept with substantial indirect paths leading to environmental action. The combined direct and indirect effects of postmaterialism on environmental action were dominant in the case of The Netherlands and West Germany, while these effects were in close competition with social class in the cases of France and the United Kingdom. In conclusion, exposure to pollution was found to hardly have any effect on environmental action since positive indirect effects were partially offset by the (negative or insignificant) direct effects. It should be noted that environmental concern came out to be the first best single predictor of environmental action in every country.

Fourth, with regard to explanatory power, our model explained between 35% and 44% of the variation in environmental action. The model also accounted for 16% to 36% of the variation in environmental concern; for the U.K. this variable was not well captured by our model. The overall statistical fit was very good for France and The Netherlands, acceptable for the U.K., and less encouraging for West Germany.

These findings have to be compared with the results of the aggregated analysis, which had been reported in the preceding section; there we found that exposure to pollution explained (besides environmental concern) environmental concern best while social class was most crucial in explaining environmental action. Postmaterialism only ranked third in this respect.

6.2 Individual Evaluation of Each Polity

In the West German model (Figure 2), the dominant impact of postmaterialism was most clearly salient: Postmaterialism best explained environmental concern and environmental action. Also, all independent concepts were moderately related to each other. Social class failed to have statistically significant structural parameter estimates that should relate it to both dependent concepts. Thus, West Germany provides the only case where environmental concern could be best explained by value change rather than by problem pressure.

The Netherlands (Figure 3) was found to share with West Germany the importance of postmaterialism in explaining environmental action: A strong indirect, structural parameter estimate links value change to environmental action.

In the French analysis (Figure 4), social class and postmaterialism carried roughly similar weight in explaining environmental action. The previously mentioned offsetting negative direct effect of exposure to pollution on environmental action is the strongest in this country. In addition, postmaterialism and social class could be seen to be strongly related to each other in France.

Like in the latter country, the link between postmaterialism and environmental concern was not statistically significant in the United Kingdom (Figure 5) although there was a strong direct effect of postmaterialism on environmental action. Among the exogenous concepts, all of which are independent of each other in this country, social class dominated the explanation of environmental action.

In comparing these four countries, two questions merit further attention: First, is there a common crossnational pattern in the structural relations? Second, do the four countries have a common measurement model? To answer these questions, three runs were conducted. The first run allowed for variation of the structural parameters while holding for all *measurement* components of the model constant. The second run imposed invariance on all parameters estimated. The very high CN statistic (1198) convinced us that no differences could be detected in the structural patterns across the four countries if the measurement model was kept constant.¹⁷ Subsequently, in order to verify the premise of an invariant measurement model, a third run was conducted with no constraints on each of the country's measurement models or each country's structural parameters. Comparing the results of this third estimation with the first run resulted in a CN statistic of 603. Since this fell short of the benchmark chosen above, we could not rule out that differences in the measurement models may cause differences in the structural relations. Visual inspection of Figures 2 through 5 indicated that the measurement model for environmental concern was more robust crossnationally than was the case for exposure to pollution.

Concluding from these findings, environmental concern was best explained by exposure to pollution in most cases, whereas the latter concept was hardly relevant in predicting environmental action. In the cases of West Germany and The Netherlands, postmaterialism was found to play a crucial role in explaining environmental attitudes, whereas social class assumed prominence in the cases of France and the U.K.

¹⁷ See Hoelter (1983). The results have to be compared with a benchmark of 800 (=4 groups times 200).

7. Comparison of Our Results With the Study by Rohrschneider

Our findings are generally supported by Rohrschneider (1988) who also used the Eurobarometer 18 data. Since France, West Germany, and the U.K. are the cases that both analyses have in common, we will restrict our comparison to these countries. In the following, we will outline the similarities and differences in the theoretical foci and the estimation methods, and then check the impact which the former factors have on the substantive findings in both studies.

Firstly, Rohrschneider's theoretical focus is on the crossnational formation of public opinion (in the comparative politics tradition) while the present investigation ultimately wishes to make a contribution to explaining governmental preferences for international environmental regulation. In our model, environmental attitudes constitute a domestic component in the explanatory process and are combined with variables representing a country's position within the international environmental structure (Sprinz, forthcoming). In Rohrschneider (1988) "environmental action", "environmental concern", and "exposure to pollution", respectively, are labelled "attitudes on environmental protection", the "sociotropic" origin of environmental attitudes, and the "self-interest" component of attitudes on environmental protection. Despite differences in terminology (and their theoretical origins notwithstanding), *the crucial components of the causal model are the same*. In addition, the operationalization of the concepts is *very* similar.

Second, differences in the estimation method chosen do have a *strong* impact on the substantive conclusions. While Rohrschneider prefers a multiple regression model with OLS (ordinary least squares) estimators, this analysis employs a LISREL approach with MLE (maximum likelihood) estimators.

In analyzing environmental attitudes, both studies agree on the basic structure of the findings. Environmental concern as well as postmaterialism were found to have a strong direct impact on environmental action, while exposure to pollution had an indirect effect on environmental action via environmental concern. However, the more complete inclusion of social class resulted in a much higher relative importance of this concept in our model. We found that the impact of social class may be in competition with the impact of postmaterialism on environmental action, and the extent thereof varies *substantially* across countries (compare Figures 2 through 5 in this study). Finally, the differences in overall explanatory power are very striking. While Rohrschneider's is able to explain between 14% and 20% of the variance of environmental action (ibid., 360, table 4),¹⁸ our analysis is capable of explaining between 35% and 44% of the variance in this dependent variable for the three countries under investigation.

¹⁸ Rohrschneider only reports the uncorrected coefficient of determination which is appropriate for comparisons with LISREL results.

From this comparison of the estimation of nearly identical conceptual models with nearly identical concept operationalizations, we may conclude that differences in statistical estimation methods matter as does model specification. Empirical research which uses LISREL models is likely to lead to more powerful results while, at the same time, facilitating conceptual interpretation and thereby parsimony.

8. Conclusions

In modeling environmental attitudes in Western Europe the following competing hypotheses were tested:

- (i) Does problem pressure (exposure to pollution) *or*
- (ii) the emergence of postmaterialist values in advanced industrial societies explain the degree of environmental concern and environmental action?
- (iii) What role does social class play in explaining environmental attitudes?

The empirical test demonstrated, firstly, that the hypotheses are rather complementary than competitive in nature. If we wish to explain environmental concern, we have to focus on exposure to pollution. If we want to explain environmental action, the impacts of environmental concern, postmaterialism and social class are likely to prevail. Second, there is a similar pattern in the structural relations among a group of countries if we use the same measurement model. Third, if we relax the assumption of a constant measurement model, we cannot rule out the explanation of differences in the structural relations by way of differences in the measurement models. Fourth, it is important to incorporate social class in order to avoid model misspecification.¹⁹ Further research comparing Eurobarometer 18 data with Eurobarometer 25 data will investigate the intertemporal reliability of the research findings over time.

In a broader perspective, our research results can be interpreted as underscoring both Hagstotz/Kösters' (1986) proposition that problem pressure (exposure) leads to environmental concern and Tucker's (1978) finding that social class is positively associated with environmental concern. Both expected relationships hold in the aggregate analysis as well as for the cases of France and the U.K. We found little support for Beck's (1986) postulate that risks are stratified by class. Therefore, our results lend more credibility to Buttel/Flinn's (1978) finding that social class and exposure are unrelated. If their "environmental reform" may be viewed as equivalent to our "environmental action", then

¹⁹ Omitting social class leads to much higher parameter estimates for postmaterialism (as shown above).

our findings may be interpreted as substantiating their conclusion that higher class is positively related to environmental action (ibid.). We also concur with Inglehart (1990) that postmaterialism is prominent in explaining environmental action. Finally, our results are in agreement with Weigel/Weigel (1978) who found a positive impact of environmental concern on environmental action.

There are still some open questions. For example, it remains to be seen whether our results hold only for this point in time. Future research will reestimate the model with data from Eurobarometer 25 (1985 data), and we hope to establish the stability of the explanatory patterns. Second, environmental action seems to be in need of better operationalization. Macroeconomic preferences of respondents may not coincide with the *actual* behavior of individuals. Eurobarometer 18 did not allow for better operationalization, but Eurobarometer 25 will permit us to draw on a richer array of questions related to environmental action.²⁰

With regard to implications of our research on environmental attitudes, our findings may help us to anticipate challenges to public policy. Firstly, environmental politics is likely to be prominent on the political agenda in the immediate future because of imminent problems such as the shortage of landfills, air pollution, hazardous waste, and global climate change. Second, value change will be an important component in explaining environmental attitudes of advanced, western economies. Consequently, there is not only a stimulus-response (or problem pressure) mechanism underlying environmental attitudes, but quality of life questions have also been brought to the forefront by the ongoing value change. Thus, the willingness to accept economic sacrifices only underlines the sincerity of public attitudes. Third, parties, the transmission belts of mass public preferences, will have to adjust their agendas (or are already in the process of doing so) by placing more emphasis on their environmental policies. If the current party system in a country is not capable of adapting to changing mass attitudes, electoral realignments are a likely result if supported by institutional arrangements. Fourth, we could envision affluent populaces to be willing to invest into an environmentally sound version of a market economy. In this respect, innovative companies will provide some "pull" and mass public attitudes will exercise some "push" towards enhancing the ecological compatibility of economic systems.

Environmental problems have existed since the early phases of industrialization. Over time, social policies, regulation of production and consumption, and other tools of public policies have tried to reconcile market-oriented economic systems with the preferences of mass publics. For sure, they influenced each other over the long run. However, we can be relatively certain that the environmental attitudes of the populaces

²⁰ The measurement models chosen here allow for comparability of the findings with the exception of environmental action.

will make certain that environmental issues are high on the political agenda beyond the last decade of the 20th century.

Bibliography

- BECK, ULRICH (1986): Risikogesellschaft - Auf dem Weg in eine andere Moderne, Frankfurt: Suhrkamp Verlag
- BUTTEL, Frederick H. and William L. FLINN (1978): Social Class and Mass Environmental Beliefs, in: Environment and Behavior, vol. 10, 433-450
- BUTTEL, Frederick H. and William L. FLINN (1978): The Politics of Environmental Concern - The Impact of Party Identification and Political Ideology on Environmental Attitudes, in: Environment and Behavior, vol. 10, 17-36
- FIETKAU, Hans-Joachim (1984): Bedingungen ökologischen Handelns - Gesellschaftliche Aufgaben der Umweltpsychologie, Weinheim: Belz Verlag
- HAGSTOTZ, Werner and Walther KÖSTERS (1986): Bestimmungsfaktoren Subjektiver Umweltbelastung: Wahrnehmung der Wirklichkeit oder Wirklichkeit der Wahrnehmung? in: Politische Vierteljahresschrift, vol. 27, 347-356
- HAYDUK, Leslie A. (1987): Structural Equation Modeling With LISREL, Baltimore: John Hopkins University Press
- HEBERLEIN, Thomas S. and J. Stanley BLACK (1981): Cognitive Consistency and Environmental Action, in: Environment and Behavior, vol. 13, 717-734
- HOELTER, J. W. (1983): The Analysis of Covariance Structures: Goodness-of fit Indices, in: Sociological Methods and Research, vol. 11, 325-344
- INGLEHART, Ronald (1990): Culture Shift in Advanced Industrial Society, Princeton: Princeton University Press
- INGLEHART, Ronald (1982): Changing Values and the Rise of Environmentalism in Western Societies, pre 82-14, Berlin: Internationales Institut für Umwelt und Gesellschaft
- INGLEHART, Ronald (1981): Post-Materialism in an Environment of Insecurity, in: American Political Science Review, vol. 75, December 1981, 880-900
- INGLEHART, Ronald (1977): The Silent Revolution - Changing Values and Political Styles Among Western Publics, Princeton: Princeton University Press
- JÖRESKOG, Karl G. and Dag SÖRBOM (1984): LISREL VI, Mooresville, IN: Scientific Software
- KESSEL, Hans and Wolfgang TISCHLER (1984): Umweltbewußtsein - Ökologische Wertvorstellungen in westlichen Industrienationen, Berlin: Science Center Berlin
- LESTER, James P. (1986): Partisanship And Environmental Policy - The Mediating Influence of State Organizational Structures, in: Environment and Behavior, vol. 12, 101-131
- OLSON, Mancur (1971): The Logic of Collective Action, Cambridge, MA: Harvard University Press
- ROHRSCHEIDER, Robert (1988): Citizens' Attitudes Toward Environmental Attitudes - Selfish or Selfless?, in: Comparative Political Studies, vol. 21, 347-367

SPRINZ, Detlef (forthcoming): International Environmental Threats Through Transboundary Acidification: Nation-Level Positions Within the International Environmental Structure, Working Paper Series of the International Institute for Applied Systems Analysis, Laxenburg: International Institute for Applied Systems Analysis, mimeo.

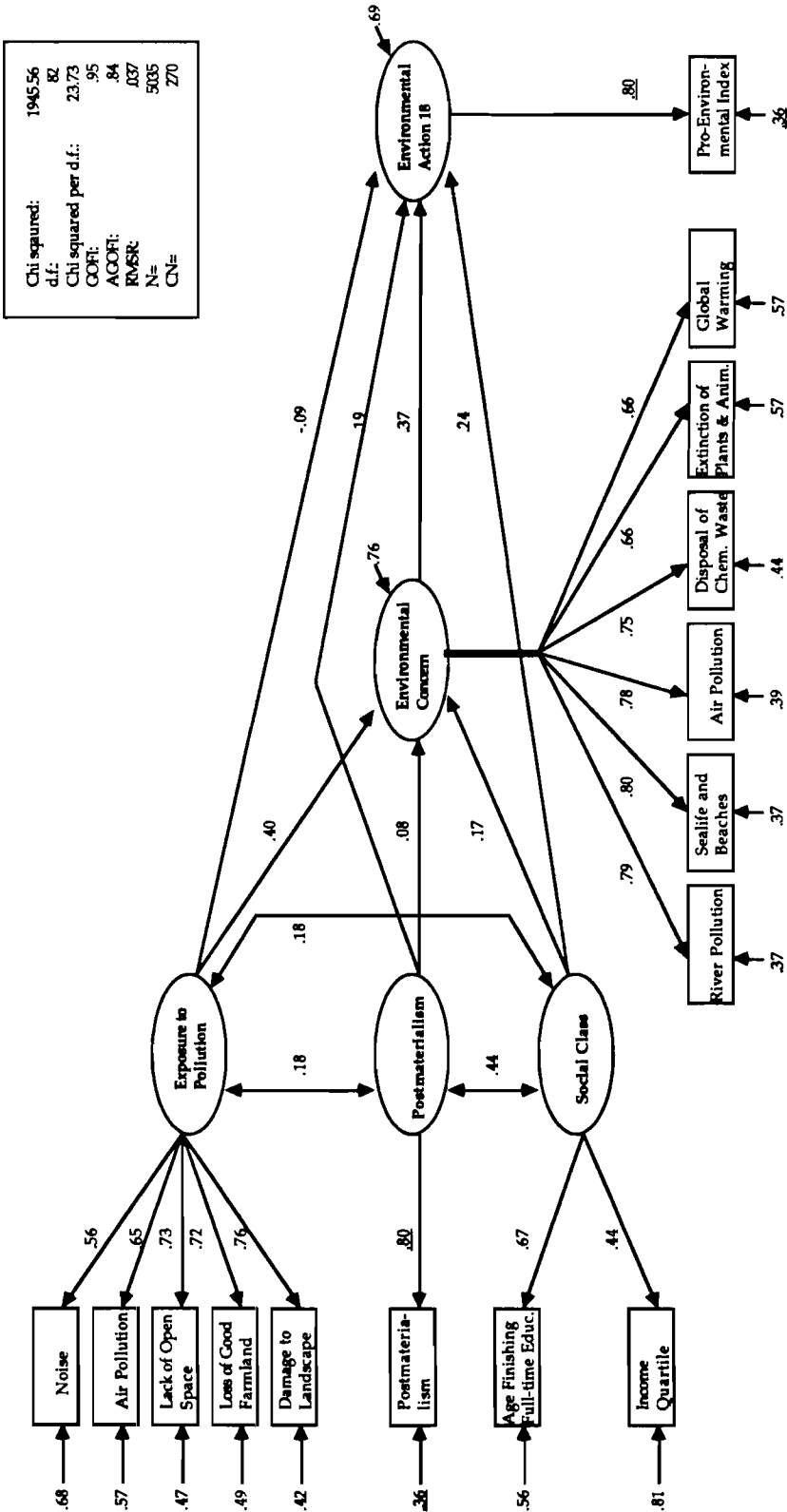
TUCKER, Lewis R. (1978): The Environmentally Concerned Citizen - Some Correlates, in: Environment and Behavior, vol. 10, 389-418

VAN LIERE, Kent D. and Riley E. DUNLAP (1981): Environmental Concern: Does it Make a Difference How It's Measured?, in: Environment and Behavior, vol 13, 651-676

WEIGEL, Russell and Joan WEIGEL (1978): Environmental Concern - The Development of a Measure, in: Environment and Behavior, vol. 10, 3-15

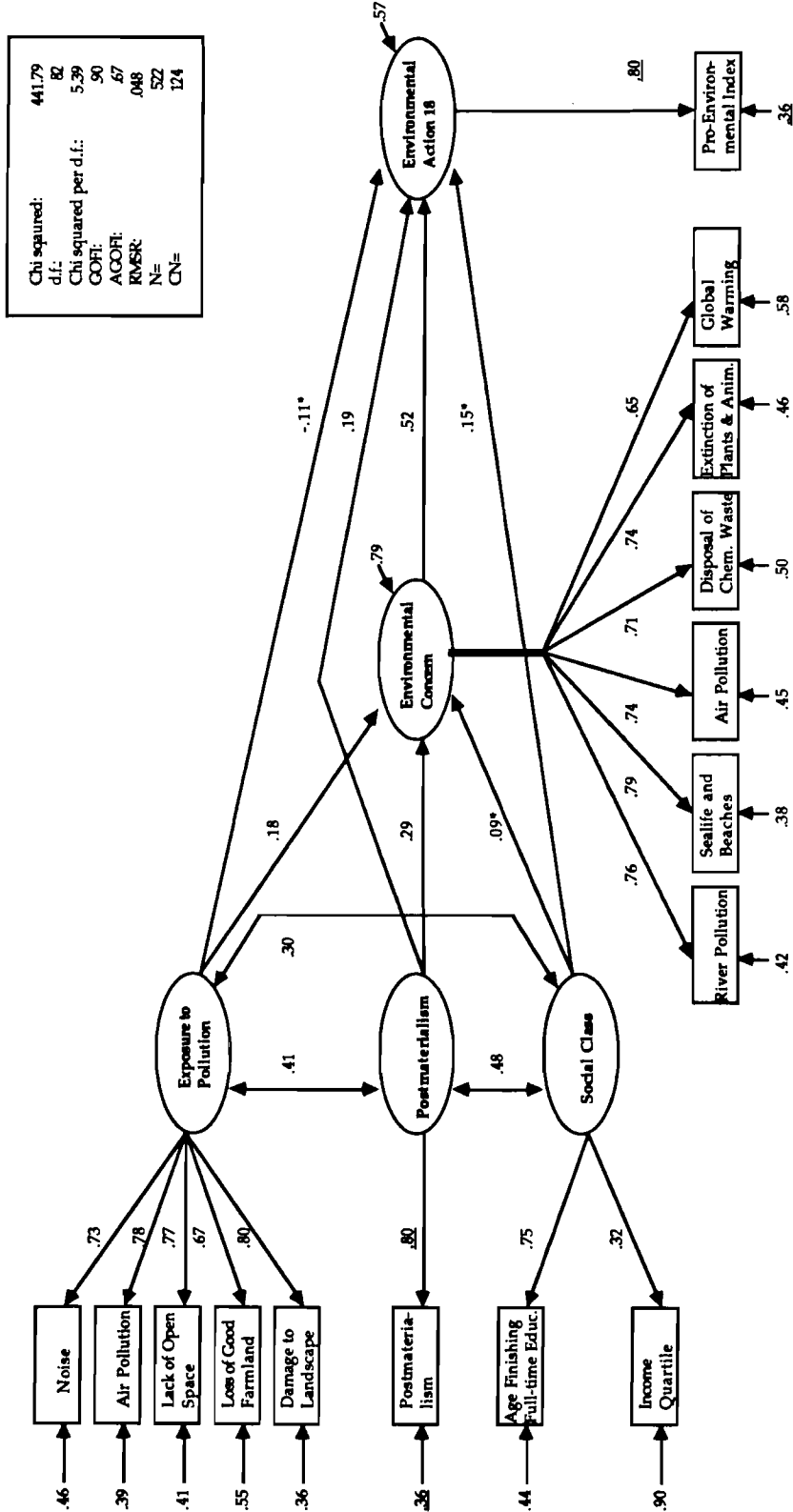
Figures

Figure 1: Model of Environmental Concern and Environmental Action: The European Aggregate
Standardized Solution (in LISREL 6.6)



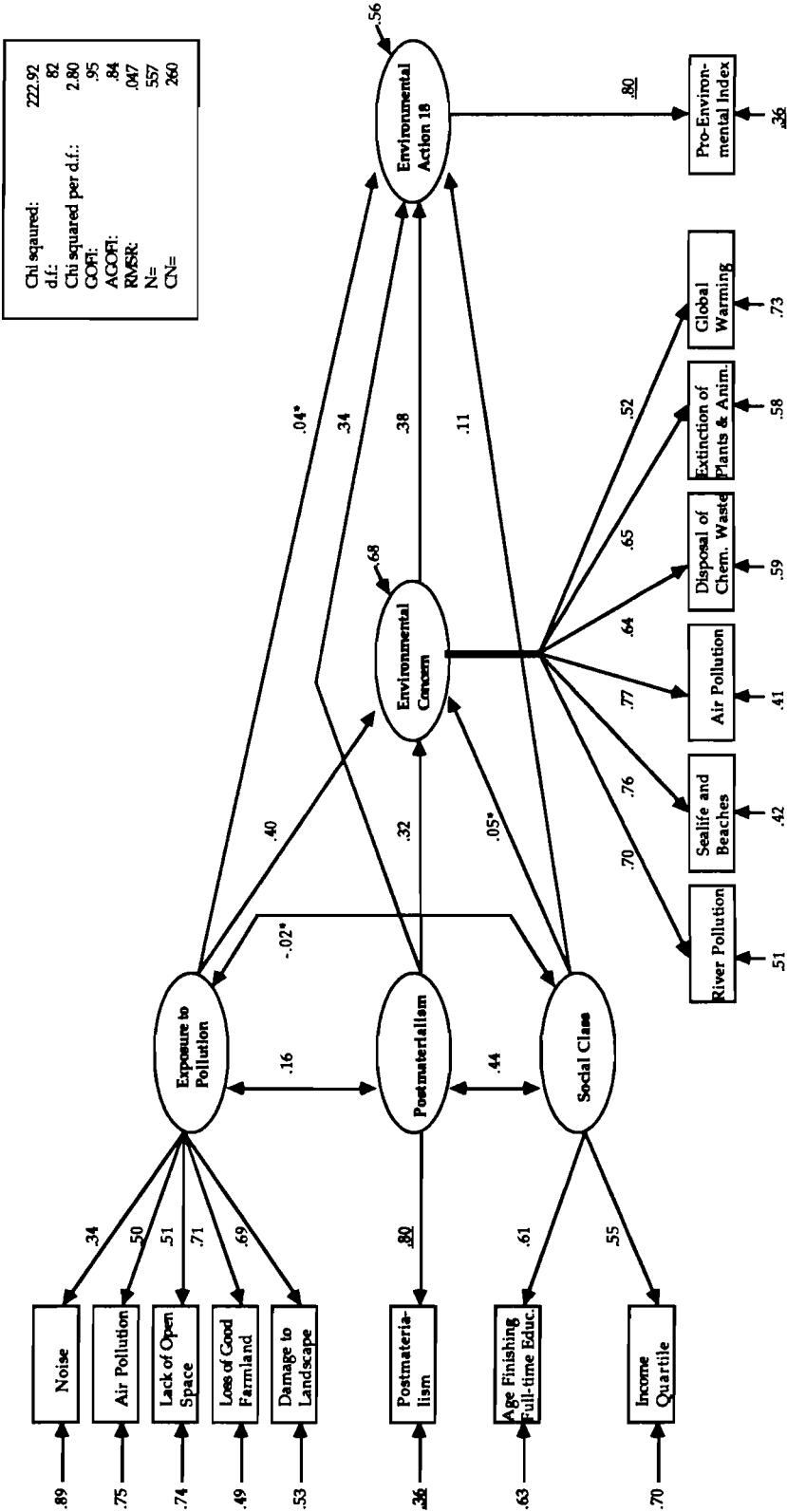
Note: Raw data originate from Eurobarometer 18 (ICPSR Study Number 9057).
All entries are significant at the .05 level if not marked by a *** (two-tailed t-test).
Underlined parameter coefficients have been fixed by the author.

Figure 2: Model of Environmental Concern and Environmental Action: West Germany
Standardized Solution (in LISREL 6.6)



Note: Raw data originate from Eurobarometer 18 (CPSR Study Number 9057).
All entries are significant at the .05 level if not marked by a * (two-tailed t-test).
Underlined parameter coefficients have been fixed by the author.

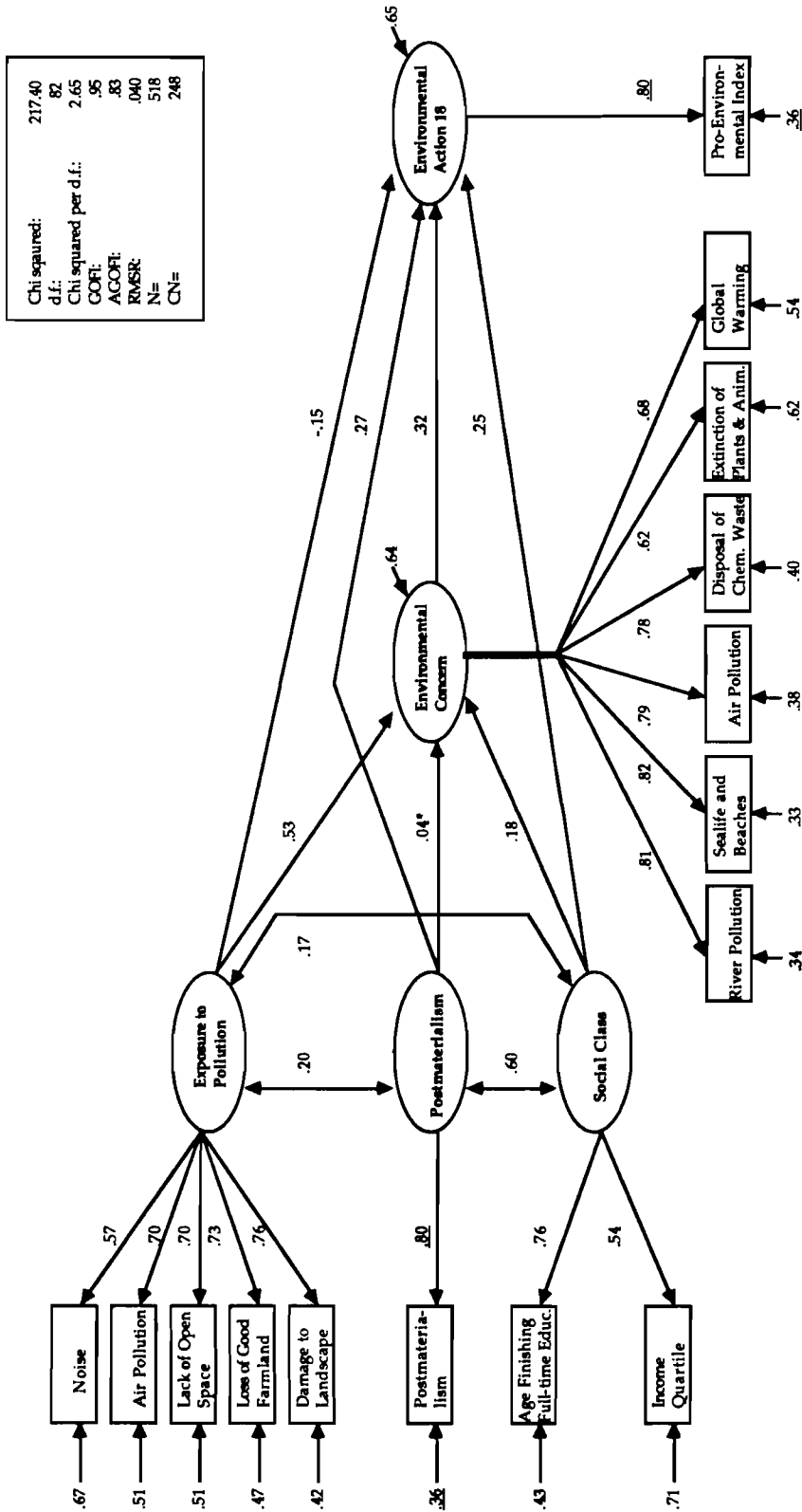
Figure 3: Model of Environmental Concern and Environmental Action: The Netherlands
Standardized Solution (in LISREL 6.6)



Note: Raw data originate from Eurobarometer 18 (CPSR Study Number 9057).
All entries are significant at the .05 level if not marked by a * (two-tailed t-test).
Underlined parameter coefficients have been fixed by the author.

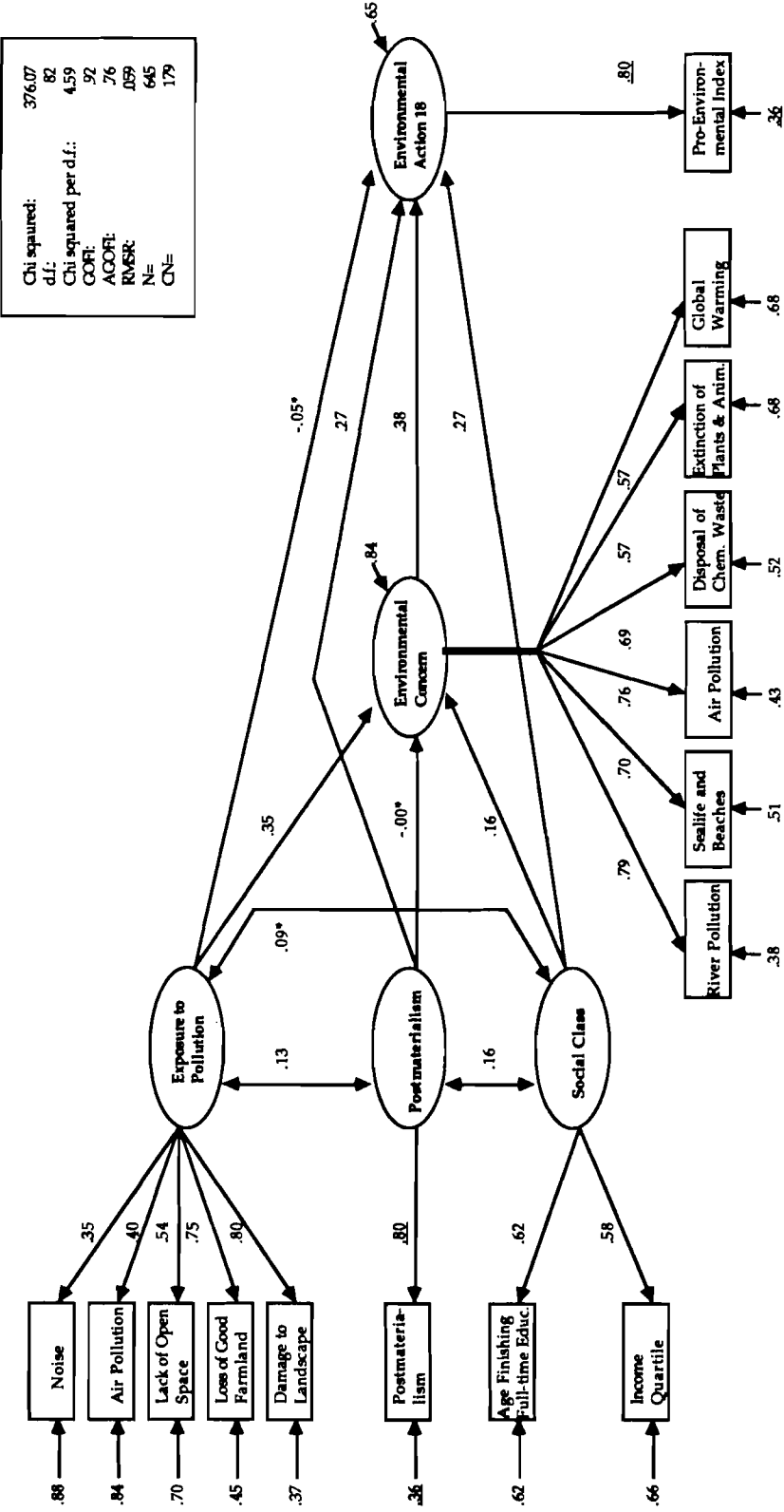
Figure 4: Model of Environmental Concern and Environmental Action: France

Standardized Solution (in LISREL 6.6)



Note: Raw data originate from Eurobarometer 18 (CPSR Study Number 9057). All entries are significant at the .05 level if not marked by a *** (two-tailed t-test). Underlined parameter coefficients have been fixed by the author.

Figure 5: Model of Environmental Concern and Environmental Action: United Kingdom of Great Britain
Standardized Solution (in LISREL 6.6)



Note: Raw data originate from Eurobarometer 18 (ICPSR Study Number 9057).
All entries are significant at the .05 level if not marked by a ** (two-tailed t-test).
Underlined parameter coefficients have been fixed by the author.