

# Grid-Group Theory and Political Orientations: Effects of Cultural Biases in Norway in the 1990s

Gunnar Grendstad\*

A number of cultural theories identify, or call for the elaboration of, deeper cultural patterns that both disallow cultural invariance and constrain cultural variation. Grid-group theory identifies four cultures: hierarchy, egalitarianism, individualism and fatalism. This article, which measures grid-group theory's four cultures by means of cultural biases, (1) explores the neglected relationship between sociodemographic correlates and cultural biases, and (2) tests the theory's hypothesized effects of cultural biases, controlled for sociodemographics, on attitudes toward nature, technology and human nature, and on geographical belonging and trust in institutions. The test draws on three independent surveys of the general public in Norway in the 1990s. The empirical results show that cultural biases are significantly explained by sociodemographics, and whereas convergent validity of cultural biases on selected attitudes and beliefs was acceptable, discriminant validity was weaker and more inconsistent.

## Introduction<sup>1</sup>

Harry Eckstein (1997) claimed that three postulates apply to culture as orientations: oriented action – that cultural orientations are economizing functions that facilitate predictions; the postulate of orientational variability – that orientations cannot be inferred directly from situations and context; and socialization – that orientations are imparted by previously socialized carriers of culture. Once the concept of culture is understood in the way of orientations, then 'anything else about cultural theories [can] be properly understood' (Eckstein 1996, 472). Eckstein pondered whether a deeper cultural pattern exists by which observed cultural orientations can be described and explained; he wondered whether, some time in the future, one may have a scheme of cultural patterns 'analogous to the periodic table' (1997, 29). Eckstein professed that grid-group theory's four cultures of hierarchy, egalitarianism, individualism and fatalism seem to be 'especially

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promising constructions for a cultural typology'. These types may be used to characterize both general political cultures as well as individual orientations.<sup>2</sup> 'Most important, each may constitute a coherent "orientational system"', the combination of which 'may in fact exhaust all possible such systems of political orientations' (1997, 31).

Predicting a lot from little should be the *sine qua non* of a theory. A limited set of cultural biases – or 'social logics' (Coughlin & Lockhart 1998), 'superorientations' (Eckstein 1997) or 'master preferences' (Wildavsky 1994) – is plausible only if they are to have an economizing function. The central feature of grid-group theory's cultural biases, which is the focus of this article, is found in their varying notions of the concept of equality. These are as follows: egalitarianism – equality of result/condition; individualism – equality of opportunity; hierarchy – procedural equality; and fatalism – 'no equality on this earth' (Thompson 1992). Each notion of equality is used to justify an issue (i.e. position, goal or policy). These four justifications, grid-group theory argues, are universal, whereas the number of issues available to them is practically unlimited. Any issue can be coopted to justify a way of life without the issue in any way constituting the way of life of the justifier. It follows that these biases, or values, should themselves be especially resistant to being modified.

Tests of grid-group theory should comply with a specific set of procedures. First, identify the four cultural biases; second, identify the four types of social relations that uphold the biases; third, show that biases and social relations go together in the manner prescribed by the theory; fourth, throughout the first three steps, test the predictions (or construct validity) of the theory. These tests should not only seek confirmation of the positive predictions of a theory, they should also corroborate a theory's negative predictions. These procedures are referred to as convergent and discriminant validity, respectively (Campbell & Fiske 1959). Empirical tests will remain incomplete if researchers neglect the two types of validity.

This article builds on and advances previous efforts in the field of measuring and testing cultural biases through surveys (i.e. steps 1 and 4 above).<sup>3</sup> Using three surveys in Norway in 1993, 1995, and 1998, the present analysis has three specific aims. First, to empirically identify and measure the four cultural biases. Second, to analyze the effects of socio-demographic correlates on cultural biases that, with a few significant exceptions, have not previously been systematically addressed.<sup>4</sup> This is also a response to the claim that 'the research on cultural theory variables has not yet controlled statistically for sociodemographic and other likely predictors' (Stern et al. 1995, 1614). Third, to assess the effects of cultural biases, controlled for sociodemographics, on a set of dependent variables, e.g. environmental concern, views on technology, views of humankind, and institutional trust.

## Theoretical Predictions and Inferences

The dependent variables offered in the present data sets are not always phrased in such a way as to meet the predictive distinctions of each bias as set forth by the theory. Some of the hypotheses below may therefore refer to clusters of biases. Identical dependent variables across two surveys will serve as a test of the stability of causal patterns. Some hypotheses are more stringently inferred from the theory than others.

### *Environmental Attitudes and Concern*

Individuals' values and choices are influenced by their way of life, and their bounded rationality provides the direction of their systematic attention (i.e. cultural bias). Individuals choose what risks to fear because the selection of certain risks will bolster their way of life (Douglas & Wildavsky 1982). The link between cultural biases and environmental concern has been most frequently illustrated by egalitarianism: the imbalance in social structure, brought about by far greater restrictions on the boundaries than on individual action within these boundaries (high group, low grid), compels the adherents of the egalitarian culture to point to risks on the evil outside to sustain the precarious inside. For that reason, the environmental issue is a benign candidate for egalitarians (Wildavsky 1991a, 74–81).<sup>5</sup> The argument comes full circle when, for example, environmental activists are worried about environmental problems 'not only because they are concerned about the fate of the earth but because they desire to transform how human beings live with one another in an egalitarian direction' (Ellis & Thompson 1997a, 885).

Similar social mechanisms can be specified for all four cultures (Thompson et al. 1990). In short, grid-group theory identifies four myths of physical nature, each of which is linked to a cultural bias and each of which serves as the basis for predicting relationships between cultural biases and the environment. In individualism, the myth of physical nature conveys that nature is robust and benign and will recover from any external shock; nature is therefore an exploitable, skill-controlled cornucopia. In egalitarianism, the myth is that nature is in harmony, but ephemeral and fragile: the least jolt may generate catastrophic and irreversible outcomes. In hierarchy, the myth of physical nature conveys that nature is tolerant within given limits, but that once procedures are unheeded and limits transgressed, the system will collapse; nature is therefore limited, but controllable. In fatalism, the myth suggests that nature is capricious, unpredictable and marred by chance; physical nature is therefore a lottery-controlled cornucopia (Thompson 1988; 1992; Schwarz & Thompson 1990; Wildavsky 1994; Grendstad & Selle, 2000).

Adherents of hierarchy would not embrace environmental concern without reservations, since problems in nature can be managed in the same way as other deviances. The hierarchical aspects of society above nature, controllability and a greater leeway for societal discretion make adherents of this culture less environmentally concerned. For adherents of individualism, risks in nature can be handled in a manner similar to other risks or opportunities. Moreover, since nature is a skill-controlled cornucopia, adherents of individualism tend not to be too environmentally concerned. It is less straightforward to categorize adherents of fatalism with respect to their environmental concern, because of their inactive complacency.

Although studies have used dissimilar measures of environmental concerns or risks (Dake 1991; Jenkins-Smith & Smith 1994; Ellis & Thompson 1997b; Marris et al. 1998; Grendstad & Selle 1999), their results converge so as to formulate the first hypothesis:<sup>6</sup>

*H1: Respondents who lean toward egalitarian biases will tend to agree more with environmental concern than those who lean toward hierarchical, individualistic or fatalistic biases.*

Myths of physical nature can sometimes take on quasi-religious aspects, in that one's social utopia is mapped onto nature. Cultural biases bear no direct causality to such images, although expectations can be inferred. Egalitarianism's notions of the 'evil outside' versus the 'precarious inside', a fragile nature, and its view of humankind as essentially good (see discussion below), should lead adherents of this culture to view nature in harmony. Dietz et al. (1998) have interpreted a notion of nature in harmony as a measure of the egalitarian's myth of physical nature as fragile. On the other hand, hierarchy's need for control and demand for subordination, individualism's sacralization of competition, and fatalism's inertia and distrust of others should lead adherents of these cultures to view nature as being in conflict. Hence,

*H2: Respondents who lean toward egalitarian biases will agree with the notion that nature is in harmony, whereas those who lean toward hierarchical, fatalistic or individualistic biases will agree with the notion that nature is in conflict, and vice versa.*

The egalitarian notion of equality of results can extend its environmental concern to include living beings other than humans. Although the argument may be contested on theoretical grounds, Swedlow and Wildavsky (in Wildavsky 1991a, 70–4) claim that advocacy of animal rights and liberation is key evidence of the rise in egalitarian culture. Hence,

*H3: Respondents who lean more toward egalitarian biases will support*

*animal rights, whereas those who lean toward hierarchical, fatalistic or individualistic biases will disagree with such rights.*

At the level of preferred environmental policies, two strategies prevail. At the roots of these strategies lies the dilemma of 'contrasting positions on the robustness of natural systems to withstand shock, the seemingly bountiful adaptiveness of human societies to cope with change . . . , and the apparent inherent unwillingness to attach much importance to what may or may not happen beyond one's lifetime' (O'Riordan & Jordan 1995, 198). First, the 'precautionary principle' prescribes that society should err on the side of safety. Decision makers should act in advance of scientific certainty and stick to the principle of risk avoidance 'where there is reasonable uncertainty regarding possible environmental damage or social deprivation arising out of a proposed course of action' (1995, 194). Despite its vagueness, the precautionary principle has 'become the repository for a jumble of adventurous beliefs' which challenges established scientific methods, contests the application of cost-benefit analysis, and 'calls for changes to established legal principles and practices such as liability, compensation and burden of proof' (1995, 191, 193).

Second, the precautionary principle is a rejection of 'the proof-first principle'. Its shorthand ethos 'if it aint broke, don't fix it' undergirds conventional economic, democratic and scientific ideas and practices (Wildavsky 1995). An important distinction between the two principles is that adherents of the precautionary principle are more likely to call for action if a possibility of harm is detected, whereas adherents of the proof-first principle prompt action, if at all, only at a certain minimum level of probability of harm. Since theorists expect adherents of fatalism to remain inactive in policy debates (Thompson & Rayner 1998), the hypothesis is:

*H4: Respondents who lean toward egalitarian biases will agree with the precautionary principle, whereas those who lean toward individualistic and hierarchical biases will agree with the proof-first principle, and vice versa.*

#### *Technology and Human Nature*

Grid-group theorists maintain that technological issues effectively separate adherents of egalitarianism from those of individualism and hierarchy (e.g. Schwarz & Thompson 1990). Technological innovation attracts adherents of individualism because of expanding opportunities, whereas for adherents of hierarchy technology is 'a way to make good on the promise of a better life if the experts and procedures it validates are followed' (Thompson et al.

1990, 271). Egalitarianism's goal of diminished differences leads its adherents to reject technology and technological progress because of its origins in big business and its potential for causing social alienation and greater inequality. The adherents themselves distrust technology due to its impurity compared with nature itself. Some technology, on the other hand, may be considered useful, since it is seen to protect nature (Douglas & Wildavsky 1982).<sup>7</sup> Although some of the correlations were weak, empirical studies have supported these positions (Wildavsky & Dake 1990; Dake 1991; 1992; Peters & Slovic 1996; Ellis & Thompson 1997a). Hence,

*H5: Respondents who lean toward egalitarian biases will see technology as harmful to humans and nature, whereas those who lean toward individualistic, fatalistic and hierarchical biases will see technology as favourable to humans and nature.*

The hierarchical myth of human nature is that humans are born in sin, but are malleable and redeemable through traditional institutions. These institutions can purify individuals and prescribe their stations so that everyone can live together harmoniously. The fatalistic myth of human nature is that humankind is unpredictable and consequently untrustworthy. Fatalism's lack of trust in others prevents individuals from improving their own lives. The individualistic myth is that individuals are born good and that their self-seeking provides benefits to all. The egalitarian myth is that humans are born good, but are corrupted by repressive and competitive institutions (Thompson et al. 1990, 33–8; Wildavsky 1994, 142–6).

There are few empirical analyses of this issue, and results are inconsistent. Boyle and Coughlin (1994, 202f.) found that a view of human nature as 'essentially good' correlated with hierarchy and individualism, whereas human nature as 'essentially evil and perverse' correlated with egalitarianism and fatalism. Ellis and Thompson (1997b, 179), however, found among organized environmentalists a positive correlation between egalitarianism and a composite variable of humankind as inherently good; other correlations were not reported. The hypothesis follows the theory:

*H6: Respondents who lean toward egalitarian and individualistic biases will tend to see human nature as essentially good, whereas those who lean toward hierarchical and fatalistic biases will tend to see human nature as essentially evil.*

#### *Geographical Ties and Institutional Trust*

Belonging and geographical ties are linked, more exploratorily, to the group dimension. Toward high group, individuals experience increasing face-to-

face contact between a limited number of individuals in shared residence, work and recreation. High group, which accounts for hierarchical and egalitarian biases, is therefore associated with more limited geographical areas. One may conjecture that these areas are limited up to the border of, say, the nation state. At low group, individuals find themselves in a social position without recognizable boundaries, where the horizon is indefinite. Low group, which translates into individualism and fatalism, is therefore expected to associate with broader geographical areas, say, from the nation state and outwards.

Trust, meaning someone or something in which confidence is placed, is 'widely considered to be of fundamental importance in political explanation' (Eckstein 1997, 32). Grid-group theory suggests that each of the four cultural biases associates with institutions according to the degree to which adherents consider them trustworthy or not (Molenaers & Thompson 1999). Hierarchy is associated with trust in formal institutions and organizations run by certified experts, and distrust of institutions associated with social deviance, insubordination and subversion of the public order. Egalitarianism is associated with trust in institutions that are critical of the established order, and distrust of institutions that challenge equality of condition. Individualism is associated with trust in institutions that secure individual freedom, competition and entrepreneurship, and with distrust of institutions that challenge equality of opportunity. Fatalism's distrust in man extrapolates to a distrust of institutions in general.

Empirically, trust has been identified as an important variable in studies of cultural biases and risk perception: the greater the trust in institutions responsible for managing certain risks or implementing certain risk policy, the less one perceives the risk (e.g. Jenkins-Smith & Smith 1994). Asking respondents who they would trust to tell the truth about risks, Marris et al. (1998) found that trade unions were distrusted by individualism and hierarchy, but trusted by egalitarianism; the government was trusted by individualism and hierarchy; hierarchy was associated with trust in scientists, whereas egalitarianism was associated with trust in the media.

#### *Sociodemographics as Cause and Control*

Cultural biases are assessed as deep-seated values and are therefore antecedent to attitudes and beliefs. It follows that cultural biases are independent variables, whereas attitudes and beliefs are dependent variables. In survey analyses, sociodemographic variables are frequently entered as independent variables of attitudes and beliefs. The independence is justified more by custom and implicit time order than by explicit theoretical merit. Yet their inclusion is instrumental and necessary in determining the causality that researchers aim to establish on behalf of their theories.



When researchers include sociodemographics as independent variables to detect their statistical effects, the variables operate as correlates. When researchers include them as independent variables in addition to those that have a prime theoretical interest, the variables operate as controls. To control means to subtract statistically the effects of independent variables (e.g. sociodemographics) other than those of theoretical interest (e.g. cultural biases) to see what the theoretically prescribed causal relationship of the correlates would be without the controls. Researchers thereby detect the net effects of the independent variables of theoretical interest on a dependent variable in excess of the controls.

The subsequent analyses draw upon six sociodemographic variables, both as correlates and controls: gender, age, education, income, occupation, and residence. Although cultural biases, attitudes and beliefs cannot be antecedent to gender or age, they are more likely to interact with education, residence, occupation, and income in ways presently unaccounted for by grid-group theory.

#### *Conjecturing Effects of Sociodemographics on Biases*

Gender divisions are expected to run along the group dimension in that women, more than men, are more likely to engage in closed networks and tight-knit groups. But women will correlate more strongly with egalitarian than hierarchical biases because of the latter's traditional affinities with patriarchy. Older people are on average expected to be more traditional, and therefore more likely to express hierarchical biases. Social inactivity is not restricted to the older generation, but it is expected to affect older people disproportionately (see Peters & Slovic 1996, 1438), leading to their being associated with fatalism. Education seems to bear little relation to cultural biases, although Peters and Slovic (1996) found the less educated to score higher on a combined fatalism/hierarchy scale. Jenkins-Smith and Smith contemplate whether increased education leads to 'a greater reluctance on the part of the more sophisticated respondents to strongly agree with any of the cultural bias items' (1994, 27). Marris et al. (1998, 639) found only those with high egalitarian scores to have 'higher educational qualifications'.

Grid-group theory holds that it is not what you have of earthly goods that matters, but what you do with them (Thompson & Wildavsky 1986). This suggests that personal and household income does not have any direct effect on cultural biases. Peters and Slovic (1996), however, found that those with less income tended to score higher on a combined fatalism/hierarchy scale. Income has also been found to correlate positively with individualism and negatively with egalitarianism (Jenkins-Smith & Smith 1994). This, in part, may be an effect of the way in which these biases are measured. The multiple

tasks of the public sector make it difficult to predict the ways in which it may affect cultural biases. Yet its conspicuous redistributive and caring role in the country where the surveys were carried out may suggest positive effects on egalitarian biases. Urban residence may provide opportunities to go from rags to riches; but the reverse route cannot be ruled out either. This correlate is most likely least capable of affecting cultural biases.

Few studies have reported the joint effects of sociodemographic correlates on cultural biases. Marris et al. (1998) included sex, age, social class, level of education, and household income in their regression model, whereas Jenkins-Smith and Smith (1994) included gender, education, income, age, and ethnic minority in theirs. Pitted against cultural biases, these correlates explained, respectively, 7 percent and 11 percent of the variance ( $R^2$ ) in egalitarianism, 16 percent and 4 percent in individualism, 16 percent and 7 percent in hierarchy, and 23 percent in fatalism (Jenkins-Smith and Smith did not include fatalism in their study).<sup>8</sup> These results suggest that cultural biases may be influenced by sociodemographics in ways unaccounted for by the theory. This quibble is approached from an orthodox position:

*H7: Sociodemographics do not correlate with any of the four cultural biases.*

#### *The Radical–Conservative Dimension*

Researchers include the radical–conservative dimension as an ideological measure in its own right (e.g. Knutsen 1995) or as a conventional correlate (e.g. Jones & Dunlap 1992). For cultural theorists, it is an ideological dimension against which cultural biases are compared and vie for prediction (Wildavsky 1987; Ellis & Thompson 1997a). Coughlin and Lockhart observe that, although ‘a unidimensional scale of political attitudes offers the virtue of parsimony, [it] is insensitive to some important distinctions’ (1998, 40, 52). They demonstrate that cultural biases increase the variance of political attitudes already explained by the left–right dimension. More important, however, ‘is the way in which cultural bias indices allow us to unpack the left–right dimension, more accurately pinpointing the foci of cleavages and isolating stronger effects than are generally produced by the conventional measure of ideology’ (1998, 48).

The eighth hypothesis concurs with previous research (Dake 1991; Grendstad & Selle 1994; Endresen 1996; Peters & Slovic 1996; Coughlin & Lockhart 1998). Due to inconsistent results and exclusion from some previous studies, the status of fatalism remains unclear. Hence,

*H8: The radical–conservative dimension covaries positively with individualism and hierarchy and negatively with egalitarianism.*

## Data, Variables and Method

### *Data Sampling*

The data used in this article are taken from three independent surveys in Norway. First, in the spring of 1993, the International Social Science Programme (ISSP) and the Norwegian Social Science Data Services (NSD) surveyed the Norwegian public on attitudes toward the environment. The international module contained questions designed to measure a number of attitudinal dimensions, but only the Norwegian survey included questions measuring cultural biases. The postal survey started off with a gross national sample of 2300 randomly drawn by the Norwegian Government Computer Center from the Central National Register. An envelope containing a cover letter, the self-administered questionnaire, and a postage-paid return envelope was mailed directly to the respondent. National regulations permitted one reminder (by postcard) and two follow-ups to non-respondents (cover letters with replacement questionnaire and postage-paid return envelope). The final sample included 1414 respondents (adjusted response rate of 63.4 percent) (Skjåk & Bøyum 1994). Second, in May 1995, a postal survey, methodologically identical to the previous one, started off with a random sample of 2000. The sampling process was closed in late June 1995, including a net sample of 1024 respondents (adjusted response rate of 52.4 percent) (Strømsnes et al. 1996).

Third, in August 1998 Gallup International Norway carried out a telephone survey. The sample was drawn by random digit dialling among private households, proportional to the number of inhabitants in every Norwegian municipality, with additional corrections for county and gender proportionality. When telephone contact was established, the interviewer asked for the adult person with the most recent birthday. If the right person was available the interview was carried out immediately. If not, standardized procedures were followed in order to obtain subsequent contact or to move on to another respondent. The sampling process included 2895 persons, of which 1006 respondents completed the interview, yielding a response rate of 34.7 percent.<sup>9</sup>

### *Cultural Biases*

All three surveys included between eight and 12 cultural bias items. Not all of the items were identical across the three surveys, but each of the four sets of items converged on the same theme.<sup>10</sup> The hierarchy items measure support for authority and respect for the past, the egalitarian items measure commitment to equalizing differences, the individualist items measure support for equal opportunity and the pursuit of property, and the fatalist items measure individual inefficacy and the futility of cooperation.

All items were presented through a five-point Likert-type response scale. The items in the 1993 and 1995 surveys used 'strongly/partly dis/agree' with a midpoint of 'both agree and disagree' and a 'don't know' option. The items in the 1998 survey used 'completely/partly agree/disagree' with a midpoint of 'neither agree nor disagree'; the 'don't know' option was not offered but recorded if the respondent volunteered it. For all three surveys, the 'don't know' option was recoded to the middle value before analysis. This procedure minimizes the number of missing cases without seriously altering the distribution of a variable.

Within each of the three data sets, all cultural bias items were cast into principal component analyses requiring four components to detect the theoretically prescribed dimensionality (see Table 1). Due to high cross-loadings in the 1993 and 1995 analyses, a fatalist item (i.e. 'cooperation with others rarely works') was excluded to ensure the necessary degree of distinctiveness between the four cultural biases across the three data sets.

Coefficient alpha measures internal consistency, the degree to which a scale measures one underlying construct only. Alphas exceeding a value of 0.70 are associated with acceptable scales. In addition, scales with such a high value reduce attenuation (Zeller & Carmines 1980; Nunnally & Bernstein 1994). The coefficient alphas in these analyses range from 0.38 to 0.61, which is low, but not surprisingly so, considering the limited number of items available for each scale.

It is impossible to know whether each of the cultural items is an equally strong measure of the underlying construct it is intended to measure. In addition, no item has an intuitive unit of measurement. Therefore, within each data set, the following scaling procedure was followed. First, each of the items was transformed into a *z*-score.<sup>11</sup> Second, each respondent was given a mean score across the number of standardized items belonging to the scale. Finally, each scale was standardized by recoding its minimum value to 0 (disagreement) and its maximum value to 1 (agreement).

Cultural bias scales should be correlated to detect the degree of independence among them. This is important with respect to the empirical distinction suggested by grid-group theory and to multicollinearity (when the scales are used as independent variables). Although correlation between biases has not been theoretically prescribed, the default assumption must be that the biases are either uncorrelated or negatively correlated, since each bias appears irrational from the perspective of any other (Schwarz & Thompson 1990, 5). This assumption, however, has not been consistently supported empirically. For instance, Dake and Wildavsky (1991) were unable to separate the scales of hierarchical and individualistic biases ( $r_{xy} = 0.54$ ) (this problem was also encountered by Marris et al. 1998), whereas Peters and Slovic (1996) were unable to distinguish hierarchy from fatalism, thus allowing these items to load on the same dimension.<sup>12</sup>

Table 1. Cultural Bias Items and Principal Component Analyses

	1993	1995	1998
Hierarchy (coefficient alpha)	0.38	0.46	0.47
Eigenvalue	1.20	1.33	1.51
One of the problems with people today is that they challenge authority too often	0.88	0.85	0.65
The best way to provide for future generations is to preserve the customs and practices of our past (i-93)	0.64	0.74	0.65
Society works best when people strictly obey all rules and regulations	<sup>d</sup>	<sup>d</sup>	0.74
Egalitarianism (coefficient alpha)	0.56	0.53	0.61
Eigenvalue	1.44	1.40	1.76
What the world needs is a fairness revolution to make the distribution of goods more equal <sup>a</sup>	0.85	0.84	0.79
I support a tax shift so that burden falls more heavily on corporations and people with large incomes <sup>b,f</sup>	0.79	0.78	0.61
The world would be a more peaceful place if its wealth were divided more equally among nations	<sup>d</sup>	<sup>d</sup>	0.81
Individualism (coefficient alpha)	0.40	0.38	0.58
Eigenvalue	1.29	1.14	1.71
Everyone should have an equal chance to succeed and fail without government interference (f-95) <sup>f</sup>	0.70	0.54	0.61
If people have the vision and ability to acquire property, they ought to be allowed to enjoy it	0.81	0.90	0.80
People who are successful in business have a right to enjoy their wealth as they see fit	<sup>d</sup>	<sup>d</sup>	0.77
Fatalism (coefficient alpha)	<sup>g</sup>	<sup>g</sup>	0.41
Eigenvalue	1.02	1.17	1.39
It seems that whichever party you vote for, things go on pretty much the same <sup>c</sup>	0.97	0.91	0.62
The future is too uncertain for a person to make serious plans	<sup>d</sup>	<sup>d</sup>	0.59
Cooperation with others rarely works	<sup>e</sup>	<sup>e</sup>	0.74
Percent variance accounted for in four-component solution	71.0	71.9	53.0
N (listwise deletion)	1342	951	1006

*Note:* All item scores are loadings on relevant component, varimax rotation, four components requested. Only on two occasions were cross-component loadings exceeding 0.30 identified; these loadings are identified within parentheses at the end of relevant item, indicating year and component on which they cross-loaded.

<sup>a</sup> In the 1998 survey 'the world' was replaced by 'our country'.

<sup>b</sup> In the 1998 surveys 'I' was replaced by 'you' to accommodate the telephone format; and 'more heavily' was replaced by 'most heavily' to increase 'difficulty', thereby reducing the high degree of agreement that was identified for the 1993 item.

<sup>c</sup> In the 1993 survey 'whichever party' was replaced by 'whomever'.

<sup>d</sup> Item not included in survey.

<sup>e</sup> Item included in survey but excluded from component solution due to confused loadings and inconsistent component solution.

<sup>f</sup> Coefficient alpha would increase were this item to be removed from the scale (1998 data only).

<sup>g</sup> Coefficient alpha not calculated.

*Source:* See text.

Table 2. Correlations between Cultural Biases; Pearson's Correlation Coefficient

	Hierarchy			Egalitarianism			Individualism		
	1993	1995	1998	1993	1995	1998	1993	1995	1998
Egalitarianism	0.04	0.09**	0.19**						
Individualism	0.24**	0.20**	0.13**	-0.17**	-0.21**	-0.16**			
Fatalism	0.12**	0.18**	0.26**	0.07*	0.08*	0.15**	0.14**	0.20**	0.12**
N-min	1387	993	1006	1383	993	1006	1383	993	1006
N-max	1404	1000	1006	1398	1000	1006	1397	1000	1006

\*  $p < 0.05$ ; \*\*  $p < 0.01$ , two-tailed; pairwise deletion of missing values.

Source: See text.

In the present study, the pattern of correlation between the cultural bias scales is, with few exceptions, similar to that observed by others (Brenot et al. 1998; Coughlin & Lockhart 1998) (see Table 2). Fatalism, individualism and hierarchy are weakly correlated, indicating that their conceptual domains partly overlap. This is unfortunate, because it might reduce these scales' ability to measure the underlying constructs correctly. Egalitarianism stands somewhat aloof from this triptych: it is almost unrelated to hierarchy and fatalism, but finds itself in significant opposition to individualism. Ellis's (1993) claim that the major conflict in modern societies takes place between egalitarianism's equality of result and individualism's equality of opportunity is thereby supported. The pattern of correlations, however, ensures that there is no significant multicollinearity between these scales.

#### *Correlates and Controls*

'Gender' is a dummy variable with women coded 1. 'Age' is measured in number of years. 'Education' is total number of years of education.<sup>13</sup> For the 1998 data, the education variable measures the level of completed education as primary education (coded 1), high-school education (coded 2) and college and university education (coded 3). 'Public sector' is a dummy variable: those who are employed in local/regional government activity, national government activity or other public or quasi-public activity are coded 1. 'Urban residence' was coded 'less densely populated area' (low score), 'small town,' 'smaller city,' 'suburb,' and 'major city' (high score). 'Income' (i.e. family/household) was measured using ten categories increasing in blocks of NOK50,000 beginning with 'under 50,000' (low score) and ending with 'more than 500,000' (high score). For the 1998 data, where respondents reported income in NOK1000, the income variable was recoded accordingly. The radicalism-conservatism dimension was measured by a self-placement scale running from a 'left' (radicalism; low score) to a 'right' position (conservatism; high score). Urban residence, income, and radicalism-conservatism

do not have an intuitive unit of measurement. Therefore, they were recoded so that their ranges run from 0 to 1. There was no substantial multicollinearity among the correlates in the three data sets.<sup>14</sup>

### *Dependent Variables*

A total of 18 constructs across the three surveys were selected to serve as dependent variables. Again, in the absence of an intuitive unit of measurement, all dependent constructs have had their ranges recoded from 0 to 1. Items and composite scales are presented in the Appendix.

### *Procedure*

If prediction is the object, then causal analysis is the appropriate technique. The causal relationships are estimated by ordinary least-squares regression. This technique allows the analyst to assess the causal linear effects of a range of independent variables simultaneously and to control for spurious relationships, if any, among them. Since all dependent constructs range between 0 and 1, the unstandardized regression coefficient ( $b$ ) shows the proportion of change in the dependent variable attributed to a one-unit change in the independent variable, controlled for the effects of other variables.<sup>15</sup> The test of statistical significance informs on the probability ( $p$ ) of the estimated effect's being equal to zero. Similar significant effects (i.e.  $p < 0.05$ ) in more than one survey demonstrate robust causal relationships. The adjusted explained variance (i.e.  $\text{adj}R^2$ ) informs on the proportion of variance in the dependent variable which can be statistically explained by its linear relationships to the independent variables, controlled for the number of independent variables in the analyses. The standard error of the estimate ( $S_{y,x}$ ) measures the average error of prediction over the entire scatter plot: the lower the standard error of the estimate, the higher the degree of linear relationship between the dependent and the independent variables in the regression. In each regression analysis, proximal predictors are entered in the second block.<sup>16</sup>

## Analyses

### *Correlates of Cultural Biases*

The first analysis, in which cultural biases are treated as dependent variables (see Table 3), shows that women tend to agree with egalitarian biases, whereas men tend to agree with individualistic biases. Older people agree with egalitarian and hierarchical biases. Education has almost consistently negative effects across the board, especially affecting hierarchy, individualism and fatalism. This result concurs with Jenkins-Smith and Smith's expectations (1994, 27). Urban residence specifically affects disagreement

Table 3. Sociodemographic Correlates of Cultural Biases; Regression Analyses; Unstandardized Regression Coefficients 1993, 1995, 1998

	Hierarchy			Egalitarianism			Individualism			Fatalism		
	1993	1995	1998	1993	1995	1998	1993	1995	1998	1993	1995	1998
Mean	0.51	0.51	0.60	0.75	0.74	0.75	0.65	0.61	0.81	0.76	0.72	0.51
<b>Block 1</b>												
Gender (1 = woman)	-0.008	-0.010	-0.007	0.040**	0.027	0.050**	-0.051**	-0.059**	-0.043**	0.038*	0.026	-0.011
Age (in years)	0.003**	0.003**	0.002**	0.001*	0.002**	0.002**	-0.000	-0.001	-0.003**	-0.001	0.001	0.002**
Education (in years)*	-0.012**	-0.012**	-0.082**	-0.004	0.000	-0.016	-0.013**	-0.003	-0.043**	-0.007*	-0.007*	-0.081**
Urban residence (0-1)	-0.049*	-0.048*	na	-0.030	-0.021	na	0.018	-0.078**	na	-0.041	-0.054	na
Public sector (=1)	-0.036*	0.007	na	0.048**	0.042*	na	-0.052**	-0.050**	na	-0.018	-0.035	na
Income (0-1)	-0.080**	-0.065*	-0.024	-0.127**	-0.011	-0.088**	0.005	0.011	-0.037	-0.085*	-0.044	-0.159**
<b>Block 2</b>												
Rad-Cons (0-1)	0.129**	0.086*	na	-0.379**	-0.445**	na	0.341**	0.315**	na	0.097*	0.142**	na
Intercept	0.542	0.525	0.681	0.994	0.873	0.737	0.686	0.589	1.060	0.884	0.756	0.722
Adj. R <sup>2</sup>	0.16	0.13	na	0.24	0.22	na	0.21	0.15	na	0.03	0.03	na
- Adj. R <sup>2</sup> , Block 1 only	0.14	0.12	0.12	0.09	0.04	0.05	0.09	0.06	0.06	0.03	0.02	0.15
SE Estimate	0.21	0.19	na	0.20	0.20	na	0.19	0.20	na	0.25	0.28	na
- SE Estimate, Block 1 only	0.21	0.20	0.21	0.21	0.22	0.23	0.21	0.21	0.20	0.25	0.28	0.23
N	881	741	872	877	740	872	879	739	872	877	734	872

\*  $p < 0.05$ ; \*\*  $p < 0.01$ . The range of all dependent variables runs between 0 and 1.

\* 1998 coding, see text.

na = correlate not included in survey/not available.

Source: See text.



with hierarchical biases, indicating that tradition and heritage are rural phenomena. Public sector is conducive to agreeing with egalitarian biases and disagreeing with individualistic biases. Income is weakly conducive to disagreeing with hierarchy, egalitarianism and fatalism. The adjusted  $R^2$  of block one ranges between 2 percent for fatalism and 14 percent for hierarchy. These results are in the same range, albeit with different magnitudes for the various biases, as those obtained by others (Jenkins-Smith & Smith 1994; Marris et al. 1998). The strong pattern in these results indicates that sociodemographics affect cultural biases. This result infirms the seventh hypothesis.

The effects of the radical-conservative dimension are statistically significant in the hypothesized direction on all the cultural biases: negative effects on egalitarianism and positive effects on the others, including fatalism. Hypothesis eight is therefore confirmed. Assessing this dimension's impact by the increase of explained variance in the cultural biases, however, reveals significant differences. For egalitarianism, the explained variances increase by 15 and 18 percentage points in 1993 and 1995, respectively, and for individualism the parallel increases are 12 and 9 percentage points. The marginal impact on hierarchy and fatalism is negligible. This strongly suggests that egalitarianism's equality of outcome and individualism's equality of opportunity are inversely related to the radical-conservative dimension. Hierarchy's notions of tradition, heritage and authority, and fatalism's traits of individual inefficacy and the futility of cooperation are not captured or accounted for by the radical-conservative dimension. This confirms Coughlin and Lockhart's claim that this dimension is 'insensitive' to important social distinctions (1998, 52).

#### *Environmental Attitudes and Concern*

Environmentalism, including beliefs, concern, animal rights, risks and policy, has perhaps been the area in which grid-group theory has been most frequently applied. The tests of hypotheses one through four are shown in Table 4. For one of the most widespread constructs of environmental concern, i.e. the New Ecological Paradigm Scale (NEP2),<sup>17</sup> adherents of hierarchy and individualism consistently disagree, whereas adherents of egalitarianism agree. With the exception of fatalism, these results corroborate the first hypothesis.

Egalitarianism strongly concurs with the view that 'nature would be at peace and in harmony if only left alone from human beings,' whereas the other three biases somewhat surprisingly also weakly concur with this view. Only individualism and fatalism significantly predict that 'nature is really a fierce struggle for survival of the fittest'; hierarchy and egalitarianism insignificantly predict this construct in the hypothesized direction. Thus,

Table 4. Environmental Attitudes and Concern; Regression Analyses; Unstandardized Regression Coefficients 1993, 1995, 1998

	New Ecological Paradigm		Nature in Peace When Left Alone		Nature Is Really a Fierce Struggle		Animal Rights		Precautionary Principle		Proof First Principle	
	1995	1998	1993	1995	1993	1995	1993	1995	1995	1995	1995	1995
Mean	0.74	0.64	0.64	0.65	0.63	0.67	0.37	0.35	0.72	0.38		
<b>Block 1</b>												
Gender (1 = woman)	0.026	0.066**	0.013	0.024	-0.008	-0.065**	0.012	0.059**	0.037*	-0.012		
Age (in years)	-0.001	-0.001*	-0.001	0.001	0.001	0.001*	-0.002**	-0.001**	-0.001	-0.000		
Education (in years)*	0.001	0.021	-0.004	-0.007*	0.001	0.005	-0.008**	-0.004	0.005	-0.005		
Urban residence (0-1)	0.014	na	0.056*	0.017	0.014	-0.014	-0.025	0.022	0.025	-0.050		
Public sector (=1)	-0.001	na	-0.036	-0.056*	-0.043*	0.009	-0.009	-0.010	-0.009	-0.001		
Income (0-1)	0.025	-0.005	-0.061	-0.003	0.030	-0.047	0.019	-0.072**	0.022	-0.035		
Rad-Cons (0-1)	-0.059	na	-0.039	-0.043	-0.022	-0.117*	-0.071*	-0.008	-0.053	-0.012		
<b>Block 2</b>												
Hierarchy (0-1)	-0.312**	-0.247**	0.011	0.023	0.046	0.015	0.017	-0.016	-0.079	0.385**		
Egalitarianism (0-1)	0.084*	0.148**	0.128**	0.178**	-0.052	-0.075	0.071*	0.083*	0.207**	-0.087		
Individualism (0-1)	-0.078*	-0.128**	0.106*	0.030	0.091*	0.113*	0.015	-0.052	0.022	0.148*		
Fatalism (0-1)	0.003	-0.116**	0.067*	0.069	0.093**	0.108**	0.041	0.061*	0.032	0.049		
Intercept	0.914	0.824	0.507	0.498	0.482	0.576	0.454	0.401	0.523	0.209		
Adj. R <sup>2</sup>	0.16	0.19	0.04	0.04	0.03	0.04	0.05	0.06	0.05	0.10		
- Adj. R <sup>2</sup> , Block 1 only	0.06	0.05	0.02	0.02	0.01	0.02	0.04	0.05	0.02	0.03		
SE Estimate	0.19	0.26	0.24	0.27	0.23	0.26	0.19	0.20	0.23	0.31		
- SE Estimate, Block 1 only	0.20	0.27	0.24	0.27	0.28	0.26	0.19	0.20	0.24	0.32		
N	729	872	859	731	853	727	864	734	730	733		

\*  $p < 0.05$ ; \*\*  $p < 0.01$ . The range of all dependent variables runs between 0 and 1.

\* 1998 coding, see text.

na = correlate not included in survey/not available.

Source: See text.

the second hypothesis is weakly corroborated with respect to 'nature as a struggle' while, due to inconsistent results, the hypothesis is not corroborated with respect to 'nature in harmony'.

Only egalitarianism, inconsistently followed by fatalism, is found to correlate significantly with animal rights issues. Because hierarchy and individualism were to correlate negatively with this issue, the third hypothesis fails to be supported.

The weak inverse relationship between the precautionary and the proof-first principles (i.e.  $r_{xy} = -0.23$ ,  $p < 0.01$ ) fails to consistently polarize the hypothesized effects of the cultural biases. Egalitarianism predicts the precautionary principle, whereas hierarchy and individualism predict the proof-first principle. Taken individually, the cultural effects on each of these policy items partially support the fourth hypothesis in terms of convergent validity. But since the weak and inconsistent pattern fails to meet the requirements of discriminant validity, the corroboration of the fourth hypothesis remains incomplete.

The radical-conservative dimension fails to significantly predict any of the environmental issues included here. This result accords with previous grid-group-based research (Jenkins-Smith & Smith 1994; Ellis & Thompson 1997b), but not with other survey research on environmentalism (e.g. Jones & Dunlap 1992). Apart from young people who endorse animal rights, few other controls contribute significantly. Indeed, the first block of correlates explain only 1–6 percent of the variance in the environmental issues. But cultural biases boost these figures for the NEP2 scale and the proof-first principle only.

### *Technology and Human Nature*

Adherents of individualism are in consistent and significant disagreement with the view that technology, in various guises, harms humans or nature (see Table 5). On the other hand, it is surprising that adherents of egalitarianism fail to mobilize consistently along lines which pit technology against humans and nature. Fatalism, which parallels the anti-technological, but insignificant, pattern suggested by egalitarianism, indicates a latent technophobia which is not consistently captured in previous research. To some extent, hierarchy departs from individualism's techno-optimism and partly, but statistically insignificantly, sides with the technological views of egalitarianism and fatalism. This result is contrary to expectations. Since the overall pattern of coefficients is inconsistent with expectations, the fifth hypothesis is therefore not corroborated.

There are only insignificant effects of cultural biases on views of human nature. The weak results fail to corroborate, or even falsify, the sixth hypothesis in any way.

Table 5. Technology and Human Nature; Regression Analyses; Unstandardized Regression Coefficients 1993, 1995

	Technological Progress Will Harm Humans		Technology Harms Nature	Technology Controls Humans	Humans Are Essentially Good
	1993	1995	1993	1995	1995
Mean	0.42	0.51	0.49	0.45	0.69
Block 1					
Gender (1 = woman)	0.076**	0.138**	0.034	0.069**	0.073**
Age (in years)	-0.001	-0.001	-0.001	0.000	0.001
Education (in years)	-0.002	0.002	0.000	-0.005	-0.004
Urban residence (0-1)	-0.045	-0.092**	-0.016	-0.020	0.030
Public sector (=1)	-0.006	-0.018	-0.000	-0.006	0.003
Income (0-1)	-0.114**	-0.107**	-0.007	-0.032	0.101**
Rad-Cons (0-1)	-0.100	-0.147*	-0.078	-0.001	-0.074
Block 2					
Hierarchy (0-1)	0.103*	0.003	-0.050	0.097*	-0.074
Egalitarianism (0-1)	0.041	0.043	0.101*	0.140**	0.006
Individualism (0-1)	-0.223*	-0.171**	-0.179**	-0.175**	0.030
Fatalism (0-1)	0.100*	0.017	0.101**	0.057	0.018
Intercept	0.558	0.661	0.537	0.395	0.626
Adj. R <sup>2</sup>	0.08	0.12	0.06	0.09	0.02
- Adj. R <sup>2</sup> , Block 1 only	0.06	0.11	0.03	0.05	0.03
SE Estimate	0.30	0.28	0.28	0.24	0.26
- SE Estimate, Block 1 only	0.30	0.28	0.29	0.24	0.26
N	854	729	861	721	731

\*  $p < 0.05$ ; \*\*  $p < 0.01$ . The range of all dependent variables runs between 0 and 1.  
Source: See text.

As for the controls, high income is conducive to disagreement with technological harm and agreement with the view that humans are essentially good (the latter corresponding with the postmaterialist prediction that increased standard of living produces good people, e.g. Inglehart 1997). Gender is consistently divided over the issue of technology and human nature. In general, the first block of correlates explain 3-11 percent of the variance in technological issues and human nature, whereas cultural biases hardly augment these figures at all.

### *Geographical Ties and Institutional Trust*

In general, insignificant effects of cultural biases on geographical ties and belonging indicate that there are no statistical relationships between implied cultural and geographical horizons (see Table 6). However, those with hierarchical biases are significantly more tied to local and regional areas, whereas those with individualist and fatalist biases significantly diverge, i.e. they are strongly tied and not tied at all, respectively, to geographical areas

outside the country in which they live.<sup>18</sup> Age and education are the most potent control predictors. All correlates combined explain 1–8 percent of the variance of the dependent variables, with cultural biases contributing nothing in excess of this.

With the conspicuous exception of fatalism, where there is consistent distrust in all institutions under study, each of the other three cultural biases is distinctly associated with at least one institution in which confidence is placed (see Table 6). Trust in the mass media and the business community and in international regimes (i.e. the European Union and United Nations) is significantly predicted by individualism's biases; trust in the Norwegian state church and the military is significantly predicted by hierarchical biases; and trust in the national political system (including the educational system, political parties, legal system and courts) is significantly predicted by egalitarian biases. Radicalism–conservatism is predictive of distrust/trust in all but one institution. All correlates statistically explain 5–10 percent of the variance of trust in institutions. Only for trust in state institutions do cultural biases significantly improve the explained variance.

## Discussion

A limited set of cultural biases as orientations is plausible only if they are to have an economizing function and if they facilitate prediction. A grander expectation on behalf of grid-group theory is that the four cultural biases constitute a 'coherent "orientational system"' which 'may exhaust all possible systems of political orientations' (Eckstein 1997, 31). When testing the predictive potential of a theory, hypotheses must be specified prior to the analysis through which both convergent and discriminant validity must be observed.

Sociodemographic correlates statistically explained cultural biases to a greater degree than could be expected. Adjusted explained variance ranged between 1 percent and 15 percent, with hierarchical biases being at the higher end. Does this mean that sociodemographics really explain cultural biases? Consider the finding that gender predicts egalitarianism and that women concur with egalitarian biases in every test but geographical ties and institutional trust. It is implausible that women concur with egalitarianism because they are born female. More, not less, cultural analysis is therefore needed to explore interactions between sociodemographics, social relations and cultural biases.

The procedure of the hypothesis testing was carried out to see how much cultural biases could explain in excess of controls (i.e. sociodemographics and the radicalism–conservatism scale). The results of this testing returned a mixed message. The up-side is that several results were consistent with

Table 6. Geographical Ties and Belonging, and Institutional Trust; Regression Analyses; Unstandardized Regression Coefficients 1995

	Geographical Ties					Institutional Trust				
	Local	Region	Norway	International	Media + Business	Church + Army	State	International Regim		
Mean	0.73	0.71	0.92	0.60	0.44	0.56	0.57	0.50		
<b>Block 1</b>										
Gender (1 = woman)	-0.016	0.042*	0.025	0.026	0.002	0.017	0.001	0.014		
Age (in years)	-0.002**	0.001*	0.002**	0.001*	-0.000	0.000	0.000	-0.000		
Education (in years)	-0.006*	-0.010**	-0.005*	0.001	-0.001	-0.004	0.004	-0.001		
Urban residence (0-1)	-0.117**	-0.012	-0.016	-0.004	-0.019	-0.050*	-0.013	0.039		
Public sector (=1)	0.001	0.010	0.016	0.029	-0.004	0.025	0.007	0.011		
Income (0-1)	0.093**	0.047	-0.001	-0.016	0.016	0.013	0.051*	0.026		
Rad-Cons (0-1)	-0.081	-0.031	0.069*	0.008	0.101**	0.124**	-0.017	0.157**		
<b>Block 2</b>										
Hierarchy (0-1)	0.142**	0.152**	0.048	-0.010	-0.004	0.190**	-0.033	0.020		
Egalitarianism (0-1)	0.025	-0.011	0.006	-0.007	-0.047	0.037	0.065*	-0.007		
Individualism (0-1)	-0.070	-0.027	-0.053	0.102*	0.100**	0.018	-0.009	0.076*		
Fatalism (0-1)	0.021	0.031	0.013	-0.084**	-0.063**	-0.031	-0.141**	-0.093**		
Intercept	0.852	0.673	0.852	0.538	0.431	0.432	0.575	0.411		
Adj. R <sup>2</sup>	0.08	0.06	0.05	0.01	0.06	0.07	0.10	0.05		
- Adj. R <sup>2</sup> , Block 1 only	0.06	0.05	0.05	0.00	0.03	0.04	0.03	0.03		
SE Estimate	0.21	0.21	0.17	0.22	0.16	0.20	0.15	0.19		
-SE Estimate, Block 1 only	0.21	0.21	0.17	0.22	0.16	0.20	0.15	0.20		
N	734	734	733	731	733	732	734	732		

\*  $p < 0.05$ ; \*\*  $p < 0.01$ . The range of all dependent variables runs between 0 and 1.

Source: See text.

the theory. This was especially the case for egalitarianism predicting environmental concerns. This result concurs with previous studies. In addition, fatalism, which tends to be neglected in some studies, proved to predict diffuse institutional distrust. The down-side is that many of the other hypothesized effects were either in the wrong direction, or statistically insignificant.

More research is needed to improve measurement of cultural biases and to test them. Efforts should also be made to develop dependent variables, each of which should be better distinguished and be more precisely related to one of the cultural types. Moreover, researchers should seek to improve distinctions between proximal and distal predictors, specifically if attitude, beliefs and value variables occur on both sides of the equation. If no such causal differentiation is made between the relevant correlates in the analysis, then correlates 'that occur late in an assumed causal sequence will be advantaged' (Franklin & Rüdiger 1995, 421-2).

Attention should also be aimed at analyzing disagreement with cultural biases: a cultural position may be held not only from agreement but also through a process of disagreement with and rejection of a contested issue. Disagreement and rejection can turn out to be consistently stronger than agreement and approval (e.g. Oskarson & Ringdal 1998, 160-1). Olli (1999) has explored the ways in which individuals combine agreements and disagreements with cultural biases. This points in the direction of combinatory methods (Ragin 1987). Olli's results suggest that a rejection of, for example, individualism may take on quite a different meaning and have a different effect depending upon whether it is combined with, for example, support for hierarchy and/or rejection of egalitarianism. The results also show that individuals combine biases in patterns inconsistent with the prediction of grid-group theory. Analytical techniques that predict the consequences of different combinations of biases may also be rewarding in explaining people's attitudes and beliefs in a larger number of fields.

## NOTES

1. A previous version of this article was presented at the ECPR workshop 'Plural Rationality and Policy Analysis', University of Mannheim, Germany, 26–31 March 1999. I thank participants of this workshop, Richard J. Ellis, Charles Lockhart, and Eero Olli, as well as two anonymous reviewers, for useful comments.
2. The basic structure of grid-group theory, or cultural theory, is not uncontested. Some emphasize its being a typology, whereas others identify a more fundamental causal pattern behind the grid and group dimensions, e.g. Douglas (1978) and Thompson (1996), respectively; see also Mamadouh (1999), Lockhart (1999), Thompson et al. (1990) and Wildavsky (1987; 1991b). Here I use the term 'grid-group theory', which is sufficient for the present purposes, as well as a concession to those who do not see this theory of culture as the only game in town.
3. For complementary survey approaches and national comparisons, see e.g. Grendstad (1999b).
4. The exceptions are Jenkins-Smith & Smith (1994), Ellis & Thompson (1997a) and Coughlin & Lockhart (1998).
5. For a concise discussion of this functional argument, see Grimen (1999).
6. For less confirmatory results, see Brenot et al. (1998) and Sjöberg (1997).
7. A view in which technology and culture are seen as more integrated can be found in Schmutzer (1995).
8. Marris et al. (1998) reported adjusted  $R^2$ , whereas Jenkins-Smith & Smith (1994) reported unadjusted  $R^2$ . Unfortunately, Marris et al.'s egalitarianism scale also included items on vegetarianism, thereby reducing its content validity.
9. NSD provided the 1993 data; collection of the 1995 data was supported by the Norwegian Research Council and the Norwegian Research Center in Organization and Management, and collection of the 1998 data was supported by a grant from the Faculty of Social Sciences, University of Bergen.
10. The cultural biases items specific to the three surveys were adapted from 'Cultural Biases Questionnaires' developed by Karl Dake, University of California at Berkeley. See Endresen (1996, 113–18) for a detailed discussion of items in the 1993 and 1995 surveys.
11. This procedure involves subtracting the mean of the item from each respondent's score and dividing by the item's standard deviation. This yields a new variable with a mean of zero and a standard deviation of one.
12. Dake & Wildavsky (1991) did not include items on fatalism.
13. In the 1995 survey, the respondent was asked to report the number of years of education exceeding compulsory education. The school system and the length of compulsory education in Norway changed during the 1960s from seven years to nine years; the rate of change in various regions of the country varied considerably. To make the 1995 figure comparable to the 1993 survey, the value of 8 was added to the 1995 education variable in order to account for, on average, the number of years of compulsory education for each respondent.
14. In 1993, the associations between the correlates ranged from  $r_{xy} = -0.30$  (age and education) to  $r_{xy} = 0.36$  (education and income); in 1995, from  $r_{xy} = -0.16$  (age and income) to  $r_{xy} = 0.20$  (education and urban residence); in 1998, from  $r_{xy} = -0.36$  (age and income) to  $r_{xy} = 0.32$  (education and income).
15. A conventional measure of causal effects is the standardized regression coefficient: beta. It is based upon variables' standard deviations, which we have no reason to believe are identical across different surveys. Beta is not used here, since its merits would be deceiving in that it fails to provide comparability.
16. The radical-conservative dimension is treated as a distal/control variable when cultural biases are entered as predictors.
17. Dietz et al. 1998; Dunlap & Van Liere 1978; Dunlap et al. 1992; Grendstad 1999a; Schultz & Zelezny 1999.
18. Geographical ties to 'Norway' reveals a distinct skewed distribution (79 percent strongly tied), indicating empirically almost invariant attachments which limit potential for covariation.



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## Appendix: Scale Items and Principal Component Loadings

<i>New Ecological Paradigm</i>		
(1995: $\alpha = 0.60$ , EV = 1.42; 1998: $\alpha = 0.60$ , EV = 1.43)	1995	1998
'Attitudes towards nature and the environment – Answer by checking one box for each of the statements'. <sup>a</sup>		
The balance of nature is strong enough to cope with the impacts of modern industrial nations	0.85	0.85
The so-called 'ecological crisis' facing humankind has been greatly exaggerated	0.85	0.85
<i>Animal Rights</i> (1993: $\alpha = 0.52$ , EV = 1.35; 1995: $\alpha = 0.41$ , EV = 1.26)		
	1993	1995
'To what degree do you agree or disagree with the following statements?' <sup>b</sup>		
Animals should have the same moral rights that human beings do	0.82	0.79
It is right to use animals for medical testing if it might save human lives	0.82	0.79
<i>Geographical attachment</i>		
	1995	
'Below is a list of various places and regions. How strong are the ties you feel to the various areas?' <sup>c</sup>		
<i>Local</i> ( $\alpha = 0.58$ , EV = 1.40):		
The place where you grew up	0.84	
The neighborhood you live in	0.84	
<i>Regional</i> ( $\alpha = 0.79$ , EV = 2.13):		
The town or municipality you live in	0.81	
The district or county you live in	0.91	
The part of the country you live in	0.65	
<i>Norway</i> (one item only)		
<i>International</i> ( $\alpha = 0.78$ , EV = 2.10):		
Scandinavia/Nordic countries	0.83	
Europe	0.90	
The global community	0.78	
<i>Trust in Institutions</i>		
	1995	
'How much trust do you have in the following institutions?' <sup>d</sup>		
<i>Media and business</i> ( $\alpha = 0.52$ , EV = 1.35):		
The press and mass media	0.82	
The business community	0.82	
<i>Church and armed forces</i> ( $\alpha = 0.50$ , EV = 1.33):		
The Norwegian state church	0.81	
The Norwegian military	0.81	
<i>National political system</i> ( $\alpha = 0.68$ , EV = 2.07):		
The Norwegian educational system	0.59	
Norwegian political parties	0.71	
The Norwegian legal system (including courts)	0.75	
Our national political system	0.81	
<i>International regimes</i> ( $\alpha = 0.45$ , EV = 1.30):		
The European Union (EU)	0.81	
The United Nations (UN)	0.81	
<i>Nature by Itself</i>		
Nature would be at peace and in harmony if only human beings would leave it alone <sup>e</sup>	1993	1995
Nature is really a fierce struggle for survival of the fittest <sup>f</sup>	1993	1995

<i>Strategies of Intervention in Nature</i>		
When it comes to environmental questions, we must often act even though we do not know how serious the situation is		1995
When it comes to environmental questions, we should wait and not implement measures until we are certain of the gravity of the situation		1995
<i>Technology</i>		
In the next 20 years do you believe that technological progress will mostly benefit or mostly harm humans (recoded: 1 = mostly benefit; 2 = both, neither; 3 = mostly harm)?	1993	1995
In your opinion, what kind of effect does the technological development have on the natural environment (recoded: 1 = predominantly positive; 2 = both positive and negative, DK; 3 = predominantly negative)?	1993	
Some people believe that humans control technology. Others believe that development has come so far that technology controls humans. Below is a scale on which these two views have been placed at either end. Where on the scale would you place your own view of the relationship between humans and technology (1 = humans control technology . . . 7 = technology controls humans)?		1995
<i>Myth of Human Nature</i>		
Some people believe that humans are essentially evil, and others believe that humans are essentially good. Below is a scale on which these two views have been placed at either end. Where on the scale would you place your own view of the nature of humankind (1 = humans are essentially evil . . . 7 = humans are essentially good)?		1995

*Note:*  $\alpha$  = coefficient alpha; EV = eigenvalue (i.e. how much of the variation in the original group of variables is accounted for by the particular component).

Response options: 1993: strongly agree/agree/neither/disagree/strongly disagree, DK; 1995: strongly disagree/disagree somewhat/both/agree somewhat/strongly agree, DK; 1998: agree completely/partly agree/neither/partly disagree/disagree completely (DK if volunteered).

<sup>a</sup> Items recoded within each survey so that high scores indicate disagreement with the items (negative tendency). The 1995 survey contained all 15 items of the revised scale, i.e. NEP2, but the 1998 survey contained only two items from the same scale. In order to obtain comparability, only two items were used in this analysis.

<sup>b</sup> Items recoded within each survey so that high scores indicate agreement with 'moral rights' and disagreement with 'medical testing'.

<sup>c</sup> The original response options, i.e. strongly tied, partly tied, little tied, not tied at all, DK, were reversed so that 'strongly tied' receives the value of 4 and 'not tied at all' receives the value of 1, with DK set to 2.5 before scale analyses.

<sup>d</sup> The original response options, i.e. very high trust, fair amount of trust, little trust, no trust at all, DK, were reversed so that 'very high trust' receives the value of 4 and 'no trust at all' receives the value of 1, with DK set to 2.5 before scale analyses.

<sup>e</sup> Items recoded within each survey so that high scores indicate agreement with 'moral rights' and disagreement with 'medical testing'.

*Source:* See text.