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Heterogeneity in Post-materialist Value Priorities. Evidence from a Latent Class Discrete Choice Approach

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Protagonists of values theory such as Inglehart—among others—have argued that values should be conceived of as relative priorities rather than absolute preferences. As such they insist on using ranking techniques of measurement which generates choice data. In this study, we aim at validating the measurement of Inglehart's (post-)materialism by means of a latent class discrete choice model. We argue that from a statistical point of view this is the appropriate way of dealing with ranking data. Furthermore, the analyses revealed a heterogeneity in (post-)materialist value priorities that has previously been left unobserved. Consistent with Inglehart's research a post-materialist class is discerned irrespective of the number of latent classes that is selected. However, as far as materialism is concerned three different types of materialist concerns can be distinguished. The validity of the empirical typology is further demonstrated by linking it to key covariates and political attitudes.

Introduction

More than 30 years ago Inglehart (1971) introduced his thesis about a cultural shift in value priorities in Western societies: political culture gradually changes in time due to a process of social metabolism in which older 'materialist' generations are replaced by younger 'post-materialist' generations. From the beginning Inglehart argued that a person's *priorities* regarding political goals reflect his or her political value orientation. Not the importance of political issues as such, but the *relative* importance of particular issues vis-à-vis other issues defines the concept of political value orientations in Inglehart's theory. By consequence, Inglehart prefers ranking rather than rating questions. Furthermore, most of his publications refer to an index in which the proportion of 'materialist' respondents is subtracted from the proportion of 'post-materialist' respondents. As such, he distinguishes among classes. Contrary to this conceptualization of values priorities, however, Inglehart and others have used research techniques to validate the measurement of post-materialist value orientations that deviate from that perspective, i.e. principal component analysis and/or confirmatory factor analysis with adjustment for ipsative measurement. A more naturalistic approach, however, is to model these ranking data as a latent class discrete choice process.

In this article, we adopt a latent class discrete choice model to validate the measurement of Inglehart's post-materialism. This is the central research question of this research. This type of

model, however, is fairly unknown to political and social scientists.[1] For this reason, we devote particular attention to explaining the method. Hence, this article also serves a didactic purpose by introducing this type of modelling within the context of a research topic that drew much (often controversial) attention within the political science literature, i.e. Inglehart's concept of post-materialism. We will demonstrate that a latent-class discrete choice approach reveals heterogeneity in post-materialist value priorities that—to the best of our knowledge—has not been documented previously.

The article is organized as follows. First, we briefly review how post-materialist value priorities have been operationalized in the past and we present our arguments why a latent class choice model can and should be used. Second, we explain this type of modelling to some length because it is fairly unknown among social scientists. Third, the results of the latent class discrete choice models are presented in a step-by-step way, in order for the reader to understand the methodological steps necessary to evaluate the latent class results. Fourth, we check the robustness of the latent class typology by comparing country specific results to the overall latent class discrete choice typology. Fifth, we demonstrate the added value of adopting a latent class discrete choice modelling in validating (post-)materialist value priorities. We do so by discussing similarities and particularities this approach reveals in estimating the effect of covariates that have played a central role in Inglehart's arguments, i.e. cohort, education, and country comparisons (Inglehart, 1977, 1990). Finally, the empirical typology is linked to political attitudes, which adds to the substantive interpretation of the different latent classes that are identified.

Measuring Post-materialist Values

The literature on value orientations tends to exaggerate conceptual divergence on values orientations. However, if one cuts through all the minor (or even less minor) differences, one can discern a tendency to fit within one of two 'traditions' (Moors, 2001). 'Fitting in' within this context does not mean that scholars fully subscribe to a particular concept of values, but rather that they share its point of departure. The two prominent traditions are: (i) Kluckhohn's view that values are 'conceptions of the *desirable*' (in: Parsons and Shils, 1951: 395) versus (ii) Rokeach' (1973: 5) definition of a value orientation as an 'enduring belief that a specific mode of conduct or end-state of existence is personally or socially *preferable* to an opposite or converse mode of conduct or end-state of existence'. This conceptual difference corresponds respectively with rating and ranking measurement of values. Inglehart's theory clearly fits within the second tradition since he claims that somebody's priorities reflect his or her value orientation, and consequently Inglehart argues for the use of ranking political goals. At first, Inglehart (1971) developed a set of four items (cf. infra) among which a first and second choice needed to be made. Since face validity of any four-item index is questionable, he later on (Inglehart, 1977) developed two other complementary sets of four issues. The European Values Study of 1990, i.e. the data analysed in this article, includes these three four-item questions. A number of researchers, however, have questioned Inglehart's measurement of values (e.g. Marsh, 1975; van Deth, 1984; Flanagan, 1987; Davis and Davenport, 1999; Davis *et al.*, 1999). Flanagan (1987) for instance, argued that the cleavage between 'materialist' and 'post-materialist' values is an artefact of the ranking technique and suggested rating alternatives. However, ranking and rating questions refer to different concepts of value orientations. Empirically, on the other hand, one can question whether rating is *functionally* equivalent to ranking. Alwin and Krosnick (1985) made a comparison between these two formats and argued that a confirmatory factor analysis of rating questions that takes into account the positive correlation between items due to correlated response error produces a latent structure that is similar though not identical to that of ranking data. Whereas ranking data produced a one-dimensional(1D) factor with bipolar items, an analysis using the rating equivalent resulted in two dimensions corresponding with the two bipolar sets of the ranking solution. These two dimensions correlated negatively, which is consistent with the ranking solution. The largest difference, however, was that covariates had different effects on the two factors of the rating items; a finding that cannot be observed with the 1D ranking solution. Alwin and Krosnick's research did not include the Inglehart questionnaire, but the latter finding is important to note since Inglehart's theory predicts generational differences in both, materialist and post-materialist, value orientation. Nevertheless, Bean and Papadakis (1994) have repeated Alwin and Krosnick's exercise by comparing rating and ranking alternatives of the Inglehart questionnaire. Their findings are very similar; ranking identified a 1D bipolar factor, whereas materialism and post-materialism were two

separate dimensions if rating questions are used. Because covariates have different effects on the two separate dimensions, Bean and Papadakis prefer the two-dimensional(2D) solution with rating data. We, on the contrary, adopt another principle, i.e. the measurement of a construct should be consistent with the conceptual definition developed within a theoretical frame of reference. For this reason, we fully agree with Inglehart's choice of ranking questions. His theory, however, does not explicitly refer to a materialist–post-materialist value *continuum*. On the contrary, much of the work on post-materialism refers to a distinction between classes, i.e. materialists versus post-materialists.[2] At the same time, the concept of post-materialism is a latent construct. The post-materialism index, which uses an ordered classification of individuals depending on values priorities, is consistent with Inglehart's concept of values. It classifies individuals in different categories depending on the combined preferences on four (short index) or 12 (long index) issues. However, since the choice pattern is not modelled, the index is not a latent construct and measurement error is not taken into account. For this purpose structural equation modelling is necessary. Most research on the topic uses the aforementioned Jackson–Alwin ipsative common factor model (Jackson and Alwin, 1980; Alwin and Jackson, 1982) that corrects for negative correlations among disturbances inherent in ipsative data (e.g. de Graaf, 1988; de Graaf *et al.*, 1989; Inglehart, 1990; Sacchi, 1998). However, this approach is embedded in the Pearsonian tradition that assumes that latent constructs are continuous measures and that manifest indicators are merely 'imperfect' measures of continuous variables. The latent class analysis that is adopted in this article fits within the Yulean tradition in which no such assumptions are made. Both indicators and latent variables are treated as nominal. As such, our approach is also consistent with Inglehart's concept of value orientations, but furthermore, it takes measurement error (or misclassification) into account.[3]

Whether the choice of Lisrel modelling in the existing literature on post-materialism was deliberately taken is hard to judge. Presumably, it was a matter of convenience since this type of analysis has become common practice in social science research. Researchers are far less familiar with latent class analysis (Yamaguchi, 2000). Even fewer know that a 'modified' Lisrel approach (Hagenaars, 1990) is possible within the context of latent class analysis. Since latent class discrete choice models are even less known, we introduce this type of modelling to some length in the next section. Before that, we like to elaborate on our arguments on why and when a latent class discrete choice model should be used.

First, theoretical and conceptual motives to adopt a latent class discrete choice model have guided this research. If a theory defines value orientations as relative priorities, then ranking data should be collected. For this reason, we believe that rating data do not simply substitute for rankings. They measure something different. We also agree with Eid *et al.* (2003) that there may be cases in which it is more reasonable to assume that there are different types of individuals, i.e. latent classes, rather than latent dimensions. Inglehart's Silent Revolution Theory (1977) is about older 'materialist' cohorts being replaced by younger 'post-materialist' cohorts. As such it can be argued that a typology approach is appropriate, irrespective of the fact that previous empirical research has focused on the issue of dimensionality (e.g. Sacchi, 1998).

Second, the previous argument is complemented with statistical considerations. Inglehart's questionnaire includes a partial ranking of items, and—as will be demonstrated in the next section—this type of data should be modelled as resulting of a sequential choice process. By consequence, it is the naturalistic way of modelling ranking data, which takes it a step further than methods that correct for the linear dependencies among the resulting data (Jackson and Alwin, 1980; Alwin and Jackson, 1982). Furthermore, statistical software is available to estimate the data in that way, which makes the approach accessible for a broader scientific community than a selective group of specialists on the subject.

Third and finally, from a methodological point of view, it is good practice to validate any measurement of value orientations by adopting different approaches. If different approaches reveal similar findings the results are more valid. As such, we fully ally with researchers who argue that method triangulation should become a standard practice in doing social research. At the same time, we believe that more and more researchers become aware of the fact that adopting only one—often common practice—approach may disguise important findings. In this research, we demonstrate that the latent class discrete choice approach articulates as well as discerns from previous findings regarding the measurement of post-materialism.

Data and Methodology

In this article, a latent class model is used to cluster respondents according to their value preference, as well

as to link clustering to covariates within a cross-cultural comparative context. Before discussing this approach in more detail, a brief presentation of the data and variables used in this article is in order.

The data analysed in this article include samples from 16 (Western) European and two North American (United States and Canada) countries selected from the 1990 European Values Studies file (source: www.europeanvalues.nl). Samples were drawn from all residents aged 18-year or older. In most countries, random sampling was applied, in others quota sampling. Each sample was weighted to correct for gender and age. The US sample was additionally weighted for race. Because we wanted to avoid that large countries dominate the latent class structure analysis, we applied an equal weighing principle for all countries with sample sizes larger than 1,000. Three countries, i.e. Finland, Iceland, and Northern Ireland with original sample sizes smaller than 1,000, however, were not up weighted.

The 1990 EVS questionnaire included the three sets of questions Inglehart has developed to measure post-materialism. These questions read as follows:

'There is a lot of talk these days about what the aims of this country should be for the next ten years. On this card are listed some of the goals which different people would give top priority. Would you please say which one of these you, yourself, consider the most important? And which would be the next most important?

Set A.

1. Maintaining a high level of economic growth.
2. Making sure this country has strong defence forces.
3. Seeing that people have more say about how things are done at their jobs and in their communities.
4. Trying to make our cities and countryside more beautiful.

Set B.

1. Maintaining order in the nation.
2. Giving people more say in important government decisions.
3. Fighting rising prices.
4. Protecting freedom of speech.

Set C.

1. A stable economy.
2. Progress toward a less impersonal and more human society.
3. Progress toward a society in which ideas count more than money.
4. The fight against crime.'

(*Source*: EVS Questionnaire 1990)

Set two is often used for calculating the 'short' Inglehart index. This short index assigns the value of '−1' to respondents who choose two materialist items; '0' indicates that a materialist item is combined with a post-materialist item; and '1' corresponds with choosing two post-materialist issues. Note that a mean score on the short index can be interpreted as the proportion 'post-materialists' minus the proportion 'materialists' (Moors, 2003). Two items of each set refer to 'materialism': set A: issues 1 and 2; set B: issues 1 and 3; and set C: issues 1 and 4. The remaining items identify 'post-materialism'. Given the equivalence in question wording a 'short' index can be developed for each set. By averaging the sum of the three 'short' indices an overall 'long' index is constructed that is equivalent to the index Inglehart adopts, when combining the answers on the three separate sets of questions. In this article, the average 'long' index is used as a reference to compare with the results of the latent class choice models. Basic idea of choosing this reference is to compare results that would have been obtained using the 'traditional' Inglehart approach with the results of the latent class discrete choice approach that we proposed.

The three sets of questions for measuring post-materialism have the form of partial ranking tasks that can be perceived as resulting of a sequential choice process (Croon, 1989; Kamakura *et al.*, 1994; Böckenholt, 2002; Vermunt and Magidson, 2003). More precisely, the first choice is a choice out of four alternatives, while the second choice is treated as a choice out of a set consisting of the three remaining alternatives. Further, we will first introduce the latent class discrete choice model for a single partial ranking task, and subsequently show how it can be generalized to multiple tasks.

Let A_1 and A_2 denote a person's first and second choice from set A. Furthermore, the discrete latent variable is denoted by X, the number of latent classes by T, and a particular latent class by t (i.e. $1 \leq t \leq T$). The latent class model defining the probability of selecting alternative a_1 as the first choice and alternative a_2 as the second choice has the following form:

$$P(A_1 = a_1, A_2 = a_2) = \sum_{t=1}^{T} P(X = t) P(A_1 = a_1, A_2 = a_2 | X = t) \quad (1)$$

Here, $P(X=t)$ is the probability of belonging to latent class t, and $P(A_1=a_1,\ A_2=a_2|X=t)$ is the class-specific probability of selecting alternative a_1 as the first choice and alternative a_2 as the second choice. Within a discrete choice framework the choice probabilities are parameterized, in terms of the utilities of the alternatives (McFadden, 1974). In our case, this implies that

$$P(A_1 = a_1, A_2 = a_2|X = t) = \frac{\tau_{a_1 t}}{\sum_{a=1}^{4} \tau_{at}} \frac{\tau_{a_2 t}}{\sum_{a \neq a_1} \tau_{at}}. \quad (2)$$

The higher the value of τ_{at}, the higher the probability that someone belonging to latent class t selects alternative a. This model differs from a standard latent class model with two indicators in that the utilities are assumed to be equal across choices and that a summation over the non-selected alternatives ($a \neq a_1$) must be used to take into account that the second choice should be different from the first choice.

As is most common, we will work with log transformed utilities which are, in fact, logit coefficients; that is,

$$\ln \tau_a = \alpha_a + \beta_{at} \quad (3)$$

For identification, we use effects coding. As a result, α_a can be interpreted as the average utility of alternative a and β_{at} as the deviation from this average utility for latent class t. Hence, a positive β_{at} value indicates that latent class t has a higher probability of selecting alternative a than average, whereas a negative value indicates the reverse.

The latent class model for a single partial ranking task is easily extended to multiple tasks. For the simultaneous analysis, the three choice sets developed by Inglehart, the latent class model defined in equation (1) is replaced by:

$$\begin{aligned} &P(A_1 = a_1, A_2 = a_2, B_1 = b_1, B_2 = b_2, C_1 = c_1, C_2 = c_2) \\ &= \sum_{t=1}^{T} P(X = t) P(A_1 = a_1, A_2 = a_2|X = t) \\ &\times P(B_1 = b_1, B_2 = b_2|X = t) P(C_1 = c_1, C_2 = c_2|X = t) \end{aligned} \quad (4)$$

Here, B_1 and B_2 denote the first and second choice from set B and C_1 and C_2 the first and second choice from set C. As was explained for $P(A_1=a_1,\ A_2=a_2|X=t)$, the terms $P(B_1=b_1,\ B_2=b_2|X=t)$, and $P(C_1=c_1,\ C_2=c_2|X=t)$ are parameterized as log utilities. To the extent that sets A, B, and C are functionally equivalent, one can expect that the effect of the latent class variable X on the choices is similar for each of the three sets. It is even possible to restrict the utilities to be equal across sets and to test whether such constraints are in agreement with the data.

An important extension of the latent class choice model described earlier is the possibility of including covariates or concomitant variables in the model (Kamakura *et al.*, 1994). A multinomial logit latent class model is then specified in which the latent class membership probabilities are regressed on covariates. This yields a latent class model that is similar to SEM (Goodman, 1974; Hagenaars, 1990; Vermunt, 1997). The covariates included in our analyses are: country, birth cohort, education (age at leaving school[4]), and socio-economic status. A description of all the variables is presented in Table 1.

Table 1 Frequencies

Attributes				
First choices		Second choices		
Set A	1	2	3	4
1 Economic growth	0	976	4,245	1,900
2 Strong defense forces	318	0	256	149
3 More say at work	2,624	367	0	2,137
4 Beautiful cities	569	133	592	0
Set B	1	2	3	4
1 Maintaining order	0	1260	1,728	1,849
2 More say	855	0	1,227	1,726
3 Fight rising prices	981	799	0	819
4 Freedom of speech	1,065	1,350	605	0
Set C	1	2	3	4
1 Stable economy	0	1,912	918	3,433
2 Humane society	1,111	0	1,295	1,215
3 Ideas count	316	561	0	538
4 Fight against crime	1,580	942	444	0
Covariates				
Cohort				
1 before 1920	1,042			
2 1920–1929	1,873			
3 1930–1939	2,051			
4 1940–1949	2,488			
5 1950–1959	2,890			
6 1960–1969	3,058			
7 1970–1972	862			

continued

Table 1 (*continued*)

Education (age at leaving school)	
1 14 or less	3,316
2 15–16	2,723
3 17–18	2,744
4 19–20	1,792
5 21 or more	3,690
Socio-economic status	
1 high	5,907
2 mid-low	5,417
3 low	2,941
Country	
1 France	834
2 Britain	907
3 Germany	799
4 Austria	910
5 Italy	876
6 Spain	801
7 Portugal	856
8 Netherlands	911
9 Belgium	810
10 Denmark	853
11 Norway	862
12 Sweden	792
13 Finland	358
14 Northern Ireland	283
15 Ireland	976
16 USA	908
17 Canada	887
18 Iceland	641

By no means we pretend to have included all possible covariates of the materialist–post-materialist classification. However, our selection of covariates is not at random either. Our selection refers to covariates that drew much attention within the framework of the post-materialism thesis. After all, Inglehart (1990, 1997) has generated quite an extended body of cross-cultural comparative research. The validity of such cross-cultural comparisons, however, depends on the validity of the measurement of values (cf. Davis and Davenport, 1999) as well as on the validity of the assumed causal effect of particular covariates (cf. Warwick, 1998; Moors, 2003). Country and cohort are obvious choices, and the effect of education and socio-economic status (Duch and Taylor, 1993) has often been discussed.

Country, cohort, and education are straightforward measures. The socio-economic status variable is the outcome of a preliminary standard latent class analysis including the information regarding occupational status of the respondent and household income (Appendix A). If, however, occupational status of the respondent was missing because he or she had never worked, then the occupational status of the chief wage earner in the household was used. This reduced the number of missing data to a minimum. Missing data on the socio-economic status and income variable are further reduced by means of a maximum likelihood estimation procedure (Vermunt, 1997) that deals with such partially missing values on the two indicators. A three latent class model fitted the data best and respondents were classified accordingly by means of modal assignment. The three classes can be interpreted as 'high', 'middle-low', and 'low' socio-economic status.

In the next sections, we discuss the findings from the analyses that were performed using version 3.0 of Latent GOLD Choice program (Vermunt and Magidson, 2003). First, we focus on the measurement part of the model. The principal issue here is deciding on the appropriate number of latent classes and, hence, involves model selection. Model selection criteria are explained in more detail in the following section. Second, we compare the effects of covariates on latent classes and estimate country-differences in latent distributions for selected models.

A Latent Class Discrete Choice Model of Post-materialism

The three sets of questions are intended to produce parallel measures of post-materialism. When Inglehart originally developed the battery of questions (1971, 1977) the four issues in each set referred to the Maslowian (Maslow and Gardener, 1954) typology of human needs: sustenance (economic) needs and safety needs constitute materialism, whereas social and self-actualization needs define post-materialism. In Table 3, we have ordered the four items of each set accordingly. Given this conceptual similarity between the three sets of items one can formulate specific expectations regarding the latent class choice output. It is obvious that a two latent class model should identify the two principal groups Inglehart has hypothesized, i.e. a materialist versus post-materialist class. These two classes should return in each of the following models in which additional classes are added. Additional classes may identify choice patterns that differentiate between what Inglehart has called mixed value types. Inglehart never devoted great attention to the 'meaning' of these mixed types, except that they combine materialist with post-materialist preferences. A latent class approach may reveal particular patterns of mixed choices that are empirically relevant. From this perspective it is always useful to compare the

Table 2 Measurement model: selection

No. of classes	*LL*	BIC(*LL*)	*N*par	L^2	df	Reduction in L^2
1	−98,236	196,557	9	11,559	1,718	1.00
2	−95,154	190,490	19	5,396	1,708	0.53
3	−94,389	189,056	29	3,866	1,698	0.67
4	−93,965	188,304	39	3,018	1,688	0.74
5	−93,796	188,060	49	2,679	1,678	0.77
6	−93,678	187,920	59	2,443	1,668	0.79
7	−93,596	187,853	69	2,280	1,658	0.80
8	−93,531	187,818	79	2,150	1,648	0.81
9	−93,465	187,782	89	2,018	1,638	0.83
10	−93,416	187,779	99	1,920	1,628	0.83

LL, log-likelihood; BIC, Bayesian information criterion; Npar, number of parameters; L^2, likelihood-ratio chi-square; df, degrees of freedom.

results of models with different number of classes and not to merely select the most appropriate model. Fit statistics that allow for model selection are presented in Table 2. We present the model log-likelihood (logL) and the associated BIC (= −2*logL + (logN)*npar). As Raftery (1986) has shown, BIC may be interpreted within a Bayesian context. The lower its value, the better a particular model is. Different from logL the BIC-value may rise again after adding latent classes and, hence, serves better for model selection. However, from Table 2, we observe that BIC continues to drop until the 10-class model, but from the five-class model onwards differences between consecutive models become small. Comparing the likelihood-ratio chi-squared values (L^2) of consecutive models confirms the above conclusion. The last column of Table 2 reports the proportional reduction in L^2 compared to the one-class model. This measure indicates which proportion of the associations between the six responses the model concerned explains. The two-class model already reduces the L^2 value by 53%. In the three- and four-class model this reduction equals 67 and 74%. From the five-class model (=77%) onwards the 'gain' in reduction of L^2 value is very small. For this reason, we compare the results of the two- to five-class models.

The relevance of adding additional classes can also be judged from a substantive point-of-view. Hagenaars (1990) has argued that one can safely interpret the results of a particular model if adding another class does not result in important changes of the latent class weights for the other classes compared to the previous analysis and the added class has little substantive meaning. In our research, we are less interested in detecting latent classes that do not systematically relate to choice patterns on each set. If we adapt this reasoning to the results reported in Table 3, we can conclude that four latent classes can be identified in which at least one item from each set is related to the particular latent class. The prevalence of four latent classes is perhaps best observed in the five-class model, since it allows identifying these four classes most clearly while adding a latent class that only relates to one particular issue. A closer comparison of the latent class weights allows interpreting the results within the context of the Inglehart thesis.

As expected the two-class model identifies the post-materialist and materialist class. The post-materialist class is observed in each analysis. From the three-class model onwards the latent class weights become even more homogeneous for all post-materialist issues. What is surprising, though, is that a materialist class with consistent positive latent class weights for the six materialist issues is not observed in any of the analyses with more than two classes. Furthermore, even items that 'belong' to the same materialist cluster, i.e. the economic 'sustenance' materialist issues versus the non-economic 'safety' issues, are not consistently related. By carefully examining the pattern of latent class weights, we can also conclude that the first and third set of the Inglehart questionnaire produce similar outcomes, whereas the weights of the items of the second set deviate from what could be expected from the Inglehart thesis. The latter finding is remarkable, since this second set was the original short question format and is still often used as such. The second class of the three-class model clusters the issues 'strong defence forces' (set A) and 'fight against crime' (set C). The two materialist issues of set B also cluster, but from the four-class model onwards it becomes clear that it is 'fighting rising prices' (set B) that really clusters with the former issues. From a political point of view such clustering makes sense if we relate it to 'typical' concerns of the 'lower' classes. 'Strong defence forces' (set A), 'fighting rising prices' (set B) and 'fight

Table 3 Latent class discrete choice models: model parameters

	Latent class choice effects (beta)													
	2 classes		3 classes			4 classes				5 classes				
Attributes	**Class1**	**Class2**	**Class1**	**Class2**	**Class3**	**Class1**	**Class2**	**Class3**	**Class4**	**Class1**	**Class2**	**Class3**	**Class4**	**Class5**
Set A[a]														
1 Economic growth	−0.466	**0.466**	−0.553	−0.643	**1.196**	−0.743	−0.829	**0.544**	**1.029**	−0.900	−0.739	**1.258**	**0.927**	−0.545
2 Strong defense forces	−0.484	**0.484**	−0.752	**0.641**	0.112	−0.805	**0.577**	0.381	−0.153	−0.862	**0.694**	0.276	−0.225	0.117
3 More say at work	**0.633**	−0.633	**0.874**	−0.207	−0.666	**0.995**	−0.107	−0.659	−0.228	**1.143**	−0.264	−1.062	−0.077	0.261
4 Beautiful cities	**0.317**	−0.317	**0.432**	0.209	−0.641	**0.554**	0.360	−0.265	−0.648	**0.620**	0.309	−0.471	−0.626	0.167
Set B[a]														
3 Fight rising prices	−0.202	**0.202**	−0.435	**0.423**	0.011	−0.663	**0.700**	−0.291	0.254	−0.449	**0.842**	−0.007	0.202	−0.589
1 Maintaining order	−0.598	**0.598**	−0.812	**0.412**	**0.400**	−0.671	−0.011	**1.506**	−0.823	−1.199	−0.256	**1.271**	−0.959	**1.143**
2 More say	**0.494**	−0.494	**0.778**	−0.545	−0.233	**0.740**	−0.367	−0.957	**0.584**	**1.018**	−0.256	−0.926	**0.733**	−0.568
4 Freedom of speech	**0.306**	−0.306	**0.468**	−0.290	−0.178	**0.594**	−0.322	−0.258	−0.015	**0.629**	−0.330	−0.338	0.024	0.014
Set C[a]														
1 Stable economy	−0.750	**0.750**	−0.968	−0.456	**1.425**	−1.232	−0.591	**0.826**	**0.997**	−1.396	−0.541	**1.666**	**0.760**	−0.489
4 Fight against crime	−0.350	**0.350**	−0.693	**0.755**	−0.062	−0.661	**0.723**	0.341	−0.404	−0.772	**0.680**	0.182	−0.487	0.397
2 Humane society	**0.543**	−0.543	**0.890**	−0.270	−0.620	**1.015**	−0.240	−0.518	−0.257	**1.148**	−0.249	−0.923	−0.065	0.088
3 Ideas count	**0.558**	−0.558	**0.771**	−0.028	−0.743	**0.878**	0.108	−0.649	−0.337	**1.021**	0.109	−0.925	−0.208	0.004
Class sizes (proportions)	*0.35*	*0.65*	*0.29*	*0.35*	*0.37*	*0.25*	*0.26*	*0.28*	*0.21*	*0.21*	*0.26*	*0.18*	*0.21*	*0.14*

[a]*Figures refer to original item ordering.*

Note: Since β's are estimated relative to the overall utility the estimated effect of one item within a set is redundant (i.e. sum of all β's=0) estimates for one latent class are also redundant.
Bold figures indicate that β's are larger than two times their standard error
Italic figures indicate proportions

Table 4 Pearson product-moment correlations of country specific latent class probabilities with the overall latent class probabilities

Country	Class1	Class2	Class3	Class4	Class5
1 Finland	0.830	0.623		0.748	
2 Germany	0.945	0.787	0.914	0.849	0.627
3 Netherlands	0.892	0.653	0.801	0.847	
4 Belgium	0.750	0.653	0.596		
5 Spain	0.924	0.800	0.875	0.928	0.639
6 France	0.764	0.796	0.771	0.628	
7 Austria	0.897	0.514	0.669	0.645	
8 Italy	0.925	0.814	0.911	0.727	
9 Britain	0.838	0.898	0.823	0.619	0.433
10 Denmark	0.909	0.572	0.847	0.744	
11 Canada	0.919	0.836	0.806	0.821	
12 Sweden	0.969	0.490	0.914	0.859	
13 Ireland	0.869	0.775	0.757	0.815	
14 Portugal	0.773	0.938	0.918	0.625	
15 Northern Ireland	0.514	0.619			
16 Iceland	0.876	0.800	0.925	0.837	
17 USA	0.829	0.856	0.903	0.812	
18 Norway	0.824	0.649	0.669		0.538

Note: All correlations significant at the 0.01 level.

against crime' (set C) are the least abstract goals that directly concern individuals. Running ahead of our results (Table 5), we found evidence for such an interpretation. To some extent this second class taps what Inglehart—in our opinion—originally intended to measure with materialism, i.e. stressing personal safety and sustenance needs (Inglehart, 1977). However, the two other economic issues and the 'maintaining order' issue are unrelated. These three issues cluster together in the third latent class of the three-class model suggesting the existence of a kind of 'conservative' elite stressing issues of macro-socio-economic order. In the four-class model, the latter pattern is somewhat less clearly observed, but in the five-class model this 'conservative' elite is again identified with about equal importance of each of the three issues mentioned. At the same time this 'conservative elite' class has a counterpart, i.e. the fourth class of the five-class model, that also stresses their concern with 'economic growth' and 'stable economy' but links it to 'giving people more say in government decisions'. Does this identify a more democratic but also macro-economic oriented class? Again the link with socio-economic covariates and political attitudes in the next sections can shed a light on this question. What has become obvious is that the 'maintaining order in the nation' issue has a very specific meaning that cannot be univocally attributed to the concept of 'safety needs'. The particularity of this issue is further stressed in the five-class model since the fifth latent class is only related to 'maintaining order in the nation'.

The key conclusion from these latent class discrete choice analyses is that 'materialism' as opposed to 'post-materialism' does not exist. Rather the concept of 'materialism' should be refined into different types of 'materialist' profiles with distinct political meaning. However, if we want to make these claims, we need to establish to what extent the five latent classes' model identifies meaningful categories within each country. Hence, we estimated the five-class model within each of the 18 countries in this study. A parsimonious way of comparing latent-class profiles of each country with the overall classification is presented in Table 4. Table 4 presents the Pearson product-moment correlations between the probability scores of belonging to a particular class in the overall latent-class choice model with the probability scores of belonging to the similar latent class of the country-specific latent-class choice model. If a country-specific latent-class profile did not sufficiently overlap with the overall profile no figure is presented in the table.

What this table reveals is that there is a fairly large amount of similarity in latent-class profiles, with only few exceptions. The most obvious exception is, of course, that the fifth latent class failed to be observed in the country specific analyses. Respondents classified within this fifth category could not be assigned unequivocally to one of the four 'meaningful' latent classes, and at the same time constitute a category that is heterogeneous as far as their values preferences is concerned. By consequence, it is of little use to assign a particular substantive meaning to this fifth latent class. This conclusion coincides with our previous argument that it is not useful to try to interpret a latent-class that is only identified by one item. However, this does not mean that a four latent class model is to be preferred. After all, the fifth latent class allowed us to filter out a group of respondents that does not fit very well into one of the four substantive latent classes.

A strong finding that supports Inglehart's claims about the existence of a post-materialist class is the fact that the first latent class is reproduced within each country.[5] The three non-post-materialist classes from the overall classification are also nicely reproduced, however, with some exceptions. The fourth latent class was not very well observed in Belgium, Norway, and Northern Ireland, whereas the third latent class failed to substantiate in Finland and Northern Ireland.

The latter two countries, however, have a small sample size. Nonetheless, the general picture is one of fairly strong similarities, especially if one takes into account that the latent class sizes vary substantially from one country to another—as will be demonstrated in the next section.

In what follows, we continue to validate the latent class discrete choice typology by first examining the effect of key socio-economic correlates as indicated by Inglehart's theory, i.e. the effect of cohort, education, and social class. Second, we will demonstrate the consequences of the empirical typology for cross-cultural comparisons. Finally, the validity of the latent class typology is demonstrated by linking it to political attitudes.

Generational, Educational, and Social Class Differences in Post-materialist Latent Choice Profiles

Ever since Lipset and Rokkan (1967) it is argued that ideological cleavages are linked to social cleavages. In Inglehart's view (1990) social class reflects the 'old' political cleavage, whereas generations represent the 'new' ideological cleavage between materialist and post-materialist political goals. As far as education is concerned Inglehart is somewhat ambiguous. To the extent that generational differences in values can be attributed to differences in education, Inglehart tends to interpret education as an individual measurement of affluence during childhood. After all, it is the affluent that are eligible to higher education. Not everybody agrees with this interpretation arguing that there is more about education than merely an indirect measure of wealthy descent (Marsh, 1975; Lafferty, 1976; de Graaf, 1988; Duch and Taylor, 1993). Duch and Taylor (1993: 754) for instance claim that post-materialist items 'are more likely to be prioritized by those who, through years of education, have learned to appreciate the values they present'. Regardless of this discussion, it is obvious that Inglehart's theory predicts that generational differences[6] in values persist even after controlling for educational and socio-economic characteristics. In Table 5, we link the latent classification to selected covariates. To simplify comparison, we present the results of the two and five latent class analyses.[7] Table 5 also includes the findings from

Table 5 Effect of cohort, education and socio-economic status on postmaterialism

	Dummy regression	Latent class choice models[b]						
	Predicted mean[a]	2-classes		5-classes				
Covariates	Inglehart index	Class1	Class2	Class1	Class2	Class3	Class4	Class5
Cohort								
1 Before 1920	−0.160	−0.390	0.390	−0.749	0.314	0.577	−0.553	0.412
2 1920–1929	−0.108	−0.236	0.236	−0.448	0.058	0.435	−0.283	0.238
3 1930–1939	−0.074	−0.126	0.126	−0.211	−0.118	0.197	0.009	0.123
4 1940–1949	−0.027	0.037	−0.037	0.140	−0.213	−0.083	0.239	−0.084
5 1950–1959	0.024	0.219	−0.219	0.485	−0.208	−0.198	0.338	−0.417
6 1960–1969	0.010	0.177	−0.177	0.307	0.039	−0.374	0.286	−0.256
7 1970–1972	0.041	0.319	−0.319	0.477	0.128	−0.554	−0.035	−0.016
Education								
1 14 or less	−0.125	−0.213	0.213	−0.488	0.785	0.148	−0.519	0.074
2 15–16	−0.089	−0.130	0.130	−0.341	0.447	0.002	−0.092	−0.016
3 17–18	−0.046	−0.047	0.047	−0.068	−0.059	−0.031	0.056	0.103
4 19–20	−0.005	0.055	−0.055	0.179	−0.408	−0.009	0.228	0.010
5 21 or more	0.092	0.335	−0.335	0.718	−0.764	−0.109	0.327	−0.172
Socio-economic status								
1 High	−0.025	−0.047	0.047	0.037	−0.425	0.201	0.232	−0.046
2 Mid-low	−0.042	−0.005	0.005	−0.070	0.064	−0.045	0.010	0.041
3 Low	−0.026	0.052	−0.052	0.033	0.361	−0.156	−0.243	0.005

Note: Values controled for country and other covariates in the table.

[a] *Since deviation coding is used the predicted mean equals the sum of the overall mean and the regression coefficient.*

[b] *Deviation coding used; sum of column and row effects equals 0.*

a traditional dummy regression model with the average 'long' Inglehart index as the depended variable. Again the latter analysis reproduces an 'Inglehart approach' which serves as a reference to evaluate the findings from the latent class choice models. However, the reader should keep in mind that both type of models yield different estimates and cannot be compared in an absolute sense of the word. What can be compared are the differences between categories of particular covariates. For instance, we can compare whether generational differences in the traditional 'Inglehart approach' are similar to the differences from the latent class models. Each of the models presented in Table 5 also included country dummies as covariates. Country differences, however, are discussed in a separate section (Table 6). Country estimates, in turn, are controlled for composition effects, i.e. cohort, education, and socio-economic status.

Results for the two-class model are not surprising since they reflect the results of the traditional regression approach with the (long) Inglehart index as dependent variable, i.e. cohort and education are strongly related to post-materialism and in the expected direction; socio-economic status is, on the other hand, nearly unrelated to post-materialism. These associations are again observed in the five-class model: post-materialism (class 1) increases with birth cohort and education, whereas socio-economic differences have a minor effect. Note that cohort differences between the post-war generations are small and that post-materialism even slightly decreases with cohort. In the previous section, we argued that the second latent class reflected the 'materialist' concerns of 'lower' classes. Table 5 confirms this interpretation since it clearly demonstrates that less educated and 'lower' socio-economic statuses are more likely to be member of the second latent class of the five-class model. Generational differences,[8] however, are less in agreement with Inglehart's theory. Preference for these materialist issues of 'fighting crime', 'fight rising prices', and 'strong defence forces' decreases for pre-war cohorts, but increases again among generations born after the second world war. Hence, a more U-shaped curve relationship between cohort and this latent class comes to the fore. Note that a slight increase among the recent cohort could have been expected given that they were raised in economically harder times than the previous generations. However, the U-turn is quite large and divergent from the curve of the post-materialist latent class. Furthermore, the very peculiar and complex relationship between cohort and economic issues is again demonstrated in the relationship with the third and fourth latent class. Both classes have in common that they stress the importance of 'economic growth' and maintaining a 'stable economy'. The fourth latent class combines this with a basic-democratic preference for 'giving more people say in government decisions'. In this case, latent class membership increases with birth cohort, except for the youngest cohort. Hence, preoccupation with economic issues is not *per se* decreasing with cohort as Inglehart's theory predicted. The likelihood of being a member of this fourth class also increases with education and socio-economic status. The generational profile of the third latent class, which also stresses the importance of the two macro-economic issues, is opposite to the fourth latent class. Membership of the third latent class decreases with birth cohort, which is consistent with Inglehart's expectations. The principal difference between the third and fourth latent class is that the former can be labelled as the more 'conservative' tenor since it stresses the issue of 'maintaining order in the nation'. The remarkable finding here is that this latent class is also related to the higher socio-economic status, but not to higher education. On the contrary, the lowest level of education is more represented. These findings suggest that this third latent class profile is associated with a particular 'self-made' social class.

Country Variations in Latent Class Membership

In his comparative studies Inglehart (1990, 1997) usually calculates the mean value on his materialist/post-materialist index for each country and relates this to other national characteristics. Most often this is done by using the World Values Studies that includes more than 40 countries. Our sample includes fewer countries and at the same time our procedure to calculate country values is somewhat different since it takes certain composition effects into account. Hence, country differences are controlled for the other covariates discussed in the previous section. We have ranked the countries (Table 6) in descending order on Inglehart's index. A mean value of 0 indicates a state of equilibrium in which the proportion of 'materialists' and the percentage of 'post-materialists' are equal. Positive values imply higher percentages of post-materialism relative to materialism; negative values indicate the reverse. We have regrouped countries using a 5 per cent difference on the Inglehart index, while at the same time distinguishing among countries in which post-materialism outweighs materialism (positive predicted means) and countries in which

Table 6 Country differences in postmaterialism

Country	Dummy regression Predicted mean Inglehart index	Latent class choice models: 2-classes Ranking[a]	Class1	Ranking[a]	Class2	Class1	5-classes Ranking[a]	Class2	Ranking[a]	Class3	Ranking[a]	Class4	Ranking[a]	Class5	Ranking[a]
1 Finland	0.082	*1*	0.592	*1*	−0.592	0.904	*1*	−0.253	*11*	−1.756	*18*	0.971	*4*	0.134	*10*
2 Germany	0.072	*2*	0.150	*8*	−0.150	0.402	*3*	−1.285	*17*	0.228	*8*	−0.003	*7*	0.658	*7*
3 Netherlands	0.069	*3*	0.275	*5*	−0.275	0.182	*10*	−0.854	*14*	−0.609	*15*	−0.285	*13*	1.565	*4*
4 Belgium	0.063	*4*	0.321	*4*	−0.321	0.279	*6*	1.225	*3*	−0.786	*17*	−0.257	*12*	−0.460	*12*
5 Spain	0.062	*5*	0.355	*2*	−0.355	0.372	*4*	0.147	*10*	−0.527	*14*	−0.173	*9*	0.181	*9*
6 France	0.041	*6*	0.332	*3*	−0.332	0.198	*8*	0.496	*7*	−0.702	*16*	−0.372	*15*	0.380	*8*
7 Austria	0.020	*7*	−0.051	*9*	0.051	−0.069	*11*	−0.758	*13*	0.157	*9*	−0.181	*10*	0.852	*6*
8 Italy	0.000	*8*	0.226	*6*	−0.226	0.296	*5*	1.085	*4*	−0.347	*13*	−0.788	*16*	−0.247	*11*
9 Britain	−0.018	*9*	0.187	*7*	−0.187	0.247	*7*	0.614	*5*	−0.013	*11*	−0.256	*11*	−0.592	*14*
10 Denmark	−0.036	*10*	−0.154	*14*	0.154	−0.130	*12*	−1.645	*18*	0.735	*3*	−1.222	*17*	2.262	*2*
11 Canada	−0.049	*11*	−0.075	*10*	0.075	0.183	*9*	0.281	*9*	−0.139	*12*	1.090	*3*	−1.414	*15*
12 Sweden	−0.063	*12*	−0.112	*12*	0.112	−0.350	*13*	−0.939	*15*	0.055	*10*	−0.335	*14*	1.569	*3*
13 Ireland	−0.074	*13*	−0.103	*11*	0.103	0.628	*2*	1.365	*1*	0.813	*1*	1.390	*1*	−4.195	*18*
14 Portugal	−0.104	*14*	−0.441	*17*	0.441	−0.486	*15*	0.546	*6*	0.745	*2*	1.291	*2*	−2.096	*17*
15 Northern Ireland	−0.110	*15*	−0.150	*13*	0.150	−0.598	*16*	0.432	*8*	0.535	*6*	0.113	*6*	−0.482	*13*
16 Iceland	−0.127	*16*	−0.397	*15*	0.397	−0.860	*18*	−0.675	*12*	0.341	*7*	−0.113	*8*	1.306	*5*
17 USA	−0.191	*17*	−0.413	*16*	0.413	−0.360	*14*	1.284	*2*	0.555	*5*	0.377	*5*	−1.855	*16*
18 Norway	−0.194	*18*	−0.542	*18*	0.542	−0.838	*17*	−1.066	*16*	0.715	*4*	−1.245	*18*	2.434	*1*

[a]*Country ranking (descending values).*

Note: Values controled for cohort, education, and socio-economic status.

materialism is relative more prominent than post-materialism (negative predicted means). Rankings were also assigned on each latent class to make comparison with the initial ranking easier.

Whereas cohort, education, and socio-economic status differences in the two-class model fairly closely corresponded with the differences on the Inglehart index, this is less obvious for countries. Similarities are still fair since both series, i.e. the Inglehart index and the first-class coefficients of the two-class model, correlate with 0.92. Most pronounced decliners in ranking are Germany (from rank 2 to 8) and Denmark (from rank 10 to 14). Spain and France, on the other hand, gain three rankings. In the five-class model, dissimilarity with the Inglehart index increases. Country values on the first post-materialist class merely correlate 0.77 with the mean country values of the Inglehart index. Different from the two-class model, Germany remains at a high level, but the Netherlands significantly drop in ranking. Ireland, on the other hand jumps from rank 13 to 2nd place. We have argued that latent classes two to four reflect different types of 'materialist' concerns. Normally, a 'materialist' country ranking should be reversed to the ranking on the Inglehart index. However, only the third class ranking correlates to some extent, i.e. −0.75. Rankings on the other latent classes reveal no similarity with rankings on the Inglehart index. Striking, however, is that country differences on these latent classes are more pronounced than on the first 'post-materialist' class. Especially, the differences on the fifth latent class are pronounced. Since this latter class is associated with one particular issue, i.e. maintaining order in the nation, this could indicate country specific 'sensitivities' for this particular issue. Nevertheless, the principal conclusion that can be drawn from these country comparisons is that they are sensitive for the way value orientations are operationalized. Even country rankings for the post-materialist class, which has been identified in all latent class models, are different from rankings obtained with the original Inglehart index. Cohort, educational, and socio-economic profiles, on the contrary, are far more equivalent as far as post-materialism is concerned. Hence, we urge prudence in comparing countries.

Political Attitudes and Latent Class Membership

So far we have discussed the internal consistency of Inglehart's post-materialism by validating its measurement and by estimating the effect of the key covariates proposed in Inglehart's theory on the likelihood of belonging to particular latent classes. The analyses clearly indicated that one can make solid arguments in favour of the existence of a post-materialist class for which the effects of key covariates such as education and cohort are in line with Inglehart's theory. As far as materialism is concerned it is equally clear that materialism cannot be reduced to a single class opposing post-materialism. Rather there are different non-post-materialist classes with a distinct outlook. In a final step, we sketch the relevance of the five-class typology by correlating the latent class probabilities of belonging to a particular class with selected political attitudes (Table 7). Again the Inglehart index functions as a comparative basis. The political attitude scales can be classified into three categories. The first set refers to cultural left issues such as environmentalism and protest proneness and which define the current agenda of the 'new left'. The second set refers to longstanding socio-economic cleavages regarding who should run business; and the discussion about individual versus state responsibility in taking care of persons. The left–right self-rating scale is often associated with these issues. Finally, cultural right issues include the level of intolerance toward ethnic–religious and social minorities and familialism.

Details on how these political attitude scales are operationalized are presented in Appendix B.

The first striking finding is that the correlations of the political attitude scales with the Inglehart index and the first post-materialist latent class are virtually identical. It confirms the known portray of post-materialist is being a new type of political left, both culturally as well as economically (Inglehart, 1990; Knutsen, 1996). At the same time, however, the correlations of political attitudes with the non-post-materialist latent classes validate our claims about the usefulness of distinguishing between different types of 'materialist' concerns. The second latent class opposes the first post-materialist class on cultural issues and expresses a cultural 'right' political profile. Previously, we have argued that the latent class profile of this second category reflects 'typical' concerns of 'lower' social classes by combining their preference for 'strong defence forces' and 'fight against crime' with the issue of 'fighting rising prices'. This profile, however, is not associated with socio-economic left–right attitudes. The third latent class expressed their preference (cf. Table 3) for 'economic growth' and 'stable economy' in combination with 'maintaining order'. We expected this as a pattern that identifies a

Table 7 Correlates of latent class probabilities (classes 1–4) with political attitude scales

	Inglehart index	Latent class choice typology (5-class model) class1	class2	class3	class4
Cultural left issues					
Environmentalism	0.223	0.216	−0.258		
Protest proneness	0.306	0.341	−0.261	−0.148	0.103
Tolerance toward interference in life and dead	0.264	0.282	−0.265	−0.133	0.100
Political–economic left–right issues					
Individual–collective social responsibility	0.190	0.192		−0.193	
Owners should run business	−0.192	−0.188		0.183	
Left–right selfrating	−0.251	−0.262		0.209	
Cultural right issues					
Intolerance social 'deviant' people	−0.217	−0.207	0.162	0.125	
Intolerance ethnic–religious minorities	−0.141	−0.128	0.109		
Familialism	−0.198	−0.216	0.234	0.103	−0.125

Note: All correlations significant at the 0.01 level $|r| < 0.100$ not shown.

'conservative' elite stressing issues of macro-socio-economic order. The correlates with political attitudes scales presented in Table 7 confirm this interpretation, i.e. the third class is socio-economic more likely to be political right and at the same time they are less prone to protest, more conservative regarding issues of interference in life and death of people and familialism, as well as less willing to accept social 'deviant' persons. Since environmentalism and intolerance toward ethnic-religious minorities are (nearly) unrelated, this class does not take a stand on respectively typical issues of the 'new' left and 'new' right. The fourth latent class that also stressed the two macro-economic issues of the Inglehart questionnaire, but combined it with a preference to 'give people more say in government' is perhaps less clearly profiled on political attitudes. This fourth latent class shows higher levels of protest proneness, higher tolerance toward interference in life and death of people and lower agreement with familialism. As such they express a type of individualism that combines the need of self-expression (i.e. protest proneness) with the rejection of traditional norm (i.e. familialism and ethical norms) as a rule for personal behaviour.

Finally, the fifth latent class in not listed in Table 7, since we were not able to find consistent correlates with political attitudes. Nevertheless, the overall picture that emerges from Table 7 is that it validates the empirical typology of post-materialist values priorities that has been established in this research. Correlates with political attitudes are in consistency with the interpretation of which classes that are identified by the latent class choice model.

Discussion

Any measurement of a social construct should be consistent with its conceptual definition. This is a sound principle to which we subscribe. Inglehart's post-materialism clearly refers to value priorities and hence involves a ranking technique in measuring value orientations. Measuring attitudes or values involves a certain level of imprecision or measurement error, which implies that the measurement model should take this misspecification into account. A naturalistic way of modelling ranking data with measurement error is by estimating latent class discrete choice models with covariates. With software becoming readily available the principal aim of this article is to demonstrate the usefulness of such an approach. Rather than being a theoretical exposé we have applied this type of modelling to the 12-item battery that Inglehart has developed to measure post-materialism. A number of findings will please the adherents of the Inglehart thesis. In each analysis a latent class labelled as 'post-materialism' could be identified. Furthermore, cohort and education were related with this latent class consistent with the theory, whereas socio-economic differences were negligible. Country positions, however, shifted depending on the number of latent classes that were selected. Correlates of the post-materialist latent class with political attitudes, on the other hand,

were again similar to correlates of these attitudes with the original Inglehart index.

From a critical point of view, however, the analyses have revealed some striking findings. First of all, we failed to observe a 'materialist' class that clusters the full set of six materialist issues in any of the models with more than two classes. Second, even items that refer to the same domain, i.e. economic versus non-economic materialist issues did not consistently cluster. Rather, three different latent classes emerged. The first class combines issues that directly concerns individuals, i.e. 'strong defence forces', 'fight against crime', and 'fighting rising prices' and is strongly related to lower levels of education and socio-economic status. Attitudinal correlates reconfirmed the identification of a cultural conservative 'lower' class profile. The two other classes express their preference for the macro-economic issues 'economic growth' and 'stable economy'. The first class (i.e. latent class 4) combines it with the democratic principle of 'giving people more say in government' and their attitudes reflected a concern for non-normative and individualistic expression. The likelihood of belonging to this class increased with cohort; which is partially contradictious to Inglehart's claims that economic materialist concern would decrease with cohort. The second class (i.e. latent class 3) that stresses their macro-economic concerns combines it with a preference for 'maintaining order in the nation'. This 'conservative' counterpart is to be found among the older generations and higher social status, and their political attitudes are in consistency with this classification.

All things considered, the overall picture that emerges from our analyses is clear. Whereas the concept of post-materialism is legitimated, Inglehart's thesis and his measurement of post-materialism failed to take into account the heterogeneity in 'materialist' concerns. Already in 1987, Flanagan has raised theoretical arguments why 'old' politics could not be reduced to the concept of materialism. What has not yet been documented—to the best of our knowledge—is that by using an appropriate technique to model ranking data, this heterogeneity in 'materialist' value priorities can be identified even within the context of the Inglehart questionnaire. Furthermore, we have shown that a theoretical meaning can be assigned to the identification of three different 'materialist' classes, both in terms of attitudinal as well as socio-demographic correlates. Apparently, the Silent Revolution (Inglehart, 1977) in political values is less a shift in balance between materialism and post-materialism values than it is an increase in heterogeneity of political values priorities.

Notes

1. A search on 'latent class analysis' at WWW/JSTOR.ORG selecting all the journals within the category of Political Science only listed 14 articles. Furthermore, we found no reference to McFadden, the founding father of the conditional logit method of analysing qualitative choice data in the 70s; a method that got him the Nobel prize in 2000. A similar search among sociological journals lists, respectively 63 and 36 references. However, 2/3 of these publications appeared in methodological journals. Hence, applications are rare.
2. It is important to note that the Inglehart index disregards the difference between first and second choice. However, the ranking information is used when exploratory or confirmatory factor analysis is used.
3. Note that a latent class approach has another appealing feature, i.e. it 'avoids' taking a stand on the issue of dimensionality, since it identifies latent classes and not latent dimensions. Even among researchers who have adopted the Jackson–Alwin ipsative common factor model to the 12-item battery there is still discussion about dimensionality (cf. Sacchi, 1998). This feature, however, is not a reason in itself to adopt a latent class approach since discussions regarding dimensionality should be theory-driven and methodological choices should be consistent with theoretical perspectives.
4. A small group who was still attending school was classified in the highest level of education.
5. Keep in mind that the coefficients for Northern Ireland should be interpreted with care since the sample size is rather small.
6. Our data are cross-sectional, meaning that it is impossible to differentiate between aging and cohort effects. Hence, our analyses are not decisive on that issue. If we refer to 'generational' differences in this article it is merely to argue that value priorities relate to age or cohort.
7. The same covariates were included in each of the five models that are presented in Table 3. There were little or no particularities in the relationship of covariates between the three- to five-class models. Hence, not all these results needed to be reported, but they are available on request by the author.
8. No Age–Period–Cohort models could be estimated given the cross-sectional nature of the data.

By consequence, we cannot draw conclusions on the age versus cohort interpretation of the results. However, irrespective of an age versus cohort interpretation Inglehart assumed a gradual increase in post-materialist values with decreasing age or increasing birth cohort.

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Appendix A

Latent-class analysis of socio-economic status

Table A1 Fit statistics

No. of classes	*LL*	BIC(*LL*)	*N*par	L^2	df
1	−95,242	1,90,657	17	2974	89
2	−94,190	1,88,735	35	870	71
3	−94,072	1,88,680	53	633	53
4	−94,006	1,88,731	71	502	35

LL, log-likelihood; Npar, number of parameters; L^2, likelihood-ratio chi-square; df, degrees of freedom.

Table A2 Latent class parameters (β)

	Cluster1	Cluster2	Cluster3
Household income (annual gross income)			
1 = lowest income level	−0.098	−1.500	1.598
2	−2.033	0.767	1.266
3	−1.080	0.623	0.457
4	−0.507	0.376	0.131
5	−0.182	0.363	−0.181
6	0.054	0.282	−0.336
7	0.565	−0.035	−0.530
8	0.597	0.172	−0.769
9	0.881	−0.244	−0.637
10 = highest income level	1.803	−0.803	−1.000
Occupational status[a]			
Employer	1.196	−0.542	−0.654
Professional worker	1.497	−1.049	−0.448
Middle lev non manual	0.905	−0.708	−0.197
Junior lev non manual	−0.160	0.396	−0.236
Foreman	0.881	1.262	−2.143
Skilled man work	−0.737	0.524	0.213
Semi-skilled man work	−1.104	0.650	0.454
Unskilled man work	−1.484	0.269	1.215
Farmer and agricult work	−0.995	−0.802	1.797

[a]*Current or last occupational status of respondent; if respondent never worked occupational status of the head of the household is used.*

Appendix B

Political attitude scales description

Cultural left issues	
Environmentalism	*Agreement with (1 = low 4 = high)* + would give part of my income to prevent environmental pollution + would agree with increase in taxes to prevent environmental pollution − Government has to reduce environmental pollution − Protecting environment and fighting pollution is less urgent
Protest proneness	*has ever done* + Signing a petition + Joining in boycotts + Attending lawful demonstrations + Joining unofficial strikes + Occupying buildings or factories
Tolerance toward interference in life and dead	*level of justification (1 = never; 10 = always justified)* + Homosexuality + Prostitution + Abortion + Euthanasia + Suicide
Political-economic left-right issues	
Individual-collective social responsibility	*Semantic differential (scale 1-10)* + Private ownership business–government ownership + Individual responsibility–state responsibility to provide + Unemployed should take any job–right to refuse a job + Competition is good–competition is harmful + Hard work brings better life–hard work does not bring success
Owners should run business	Single item (1 = yes, 0 = no)
Left-right self rating	Single rating (scale 1 to 10)
Cultural right issues	
Intolerance social 'deviant' people	*Not as neighbour (1 = yes, 0 = no)* + People with criminal record + Heavy drinkers + People with aids + Drug addicts + Homosexuals
Intolerance ethnic-religious minorities	*Not as neighbour (1 = yes, 0 = no)* + People of a different race + Muslims + Immigrants + Jews + Hindus
Familialism	*Agreement with (1 = low 4 = high)* − working mother just as warm and secure relationship with children as non-working + Pre-school child likely to suffer if mother works + What most women really want is a home and children + Being a housewife is as fulfilling as working for pay

Note: Attitude scales are single-item indicators or composite scales; scaling of items indicated with '−' are reversed.