Clustering Methods in the Context of Comparative Analysis - Ideological Consciousness of Classes in the Former Yugoslavia

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Abstract

    In the article the author deals with possible application of methods of clustering
in comparative research. An example of hierarchical clustering is applied to
empirical data collected within the frame of the research project 'The class structure
of contemporary Yugoslav society' (data were collected in all republics and autono-
mous provinces in the period from June 1986 to June 1987 on the basis of identical
random sampling of residents in each republic and province). Researchers endeavoured
to ascertain whether the former Yugoslavia constituted one homogeneous society or
whether there existed several independent and coherent societies. In that frame, the
following hypothesis was tested: with respect to ideological consciousness, did
members of social classes of particular republics and provinces differ according to
their class adherence or according to their republic/province adherence. The
hypothesis was tested by following methods of hierarchical clustering: maximum,
Ward's and Gower's method. 48 classes - six from each republic and province
(workers, officials, experts, executives, farmers, tradesmen) - were clustered accord-
ing to the values of five conscious variables, which represented the extent of the
interiorization of elements of the ruling ideology in the former Yugoslavia. On the
basis of results, the following conclusion appears: republic adherence was more
important for clustering into two groups (Slovenia and the rest of Yugoslavia), while
class adherence was more important for further divisions. In light of these results,
the author proposes that it is possible to use clustering methods to test hypotheses
on causal relations. Of course, this is possible only in combination with other
procedures and only as a hypothetical starting poiunt or as a supplement illustration.

Keywords: Classification; Hierarchical clustering; Republics and provinces; Causal
analysis.

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1.

A comparative analysis of certain social phenomenon requires at the very start a classification of units that are to be compared; it is usually a matter of territorial units with the characteristics of coherent social systems (e.g. a state). This classification is first of all done on the basis of differences i.e. similarities among the units with reference to the phenomenon we are researching, and then regarding the determinants of the researched phenomenon, or regarding some general features of the units which are compared. The process of establishing differences among the units and their classification certainly represents only the first level of the comparative analysis, which is then followed by an explanation of the discovered differences. In our case we are going to restrict ourselves to the classification level; some analytical possibilities of the application of the method of hierarchical clustering will be explained on a concrete example.

In comparative analysis we usually start from the assumption that individual units being compared stand for coherent social systems - societies. The key hypothesis on the classification level of analysis thus presupposes that societies can be classified into typical groups. We have placed our comparative analysis within the framework of the former Yugoslavia in the second half of the eighties, hence in the period preceding the commencement of its disintegration. Units of comparison were individual republics and the two provinces of the former federal state. In this context the research problem was defined on a general level by asking the following question: **is it possible to talk about a uniform society in the regions of the former Yugoslavia, or were there various different societies acting as coherent independent systems in the regions of former Yugoslavia.** Here we focused on the issues of class i.e. strata structure in the former Yugoslavia, i.e. in its federal, units and we concretized the starting problem by asking the following question: **is it possible to talk about classes which developed and existed throughout all the former Yugoslavia, or must we speak of classes within particular republics, or groups of republics.**

To answer this question we looked to consciousness; by which we refer to that dimension of the individual consciousness of the members of particular classes, which represents the "internalization" of the discourse of **the ruling** ideology in the former Yugoslavia[1]. It is a fact that ideology also has the function of constituting social groups (e.g. classes) as real elements of social structure (e.g. Therborn, 1980). Ideology, or rather its discourse shines through the individual consciousness of an individual, whereas the realization of its constitutive function on the level of social groups (classes) is (also) manifested in a higher or lower stage of crystallization and homogenization of the empiric individual consciousness of the members of these social groups. In the context of comparative analysis of social structure of the former Yugoslavia there is, in connection with the effects of ideology(ies), a relevant question, namely whether there are any differences among the regions of the former Yugoslavia which reflect of these ideological effects on the consciousness level of the members of social groups. More precisely, with regards to ideological consciousness: **do members of social classes of particular republics and provinces differ more, from each other according to their class adherence or according to their republic/province adherence.** In other words the question is whether the homogenization of (ideologi-

cal) consciousness of members of social classes was present throughout the former Yugoslavia, which would allow discussion of the consciousness of "Yugoslav" classes (in this case class adherence would be a more important determinant of "internalization" of the ideological story), or whether it was limited to particular republics and provinces, so that we can talk about the counsciousness of "republic" classes (in this case republic/ province adherence would be more important).

2.

Let us examine the use of clustering methods in the analysis of this problem. The analysis was carried out on the basis of data gathered within the project "Class structure of contemporary Yugoslav society".[2] We prepared the classification (CLASS) of the following six basic vocational categories (the unemployed were excluded, as well as housewives, students, pensioners):

  1 - workers (blue collar)
  2 - officials (white collar)
  3 - experts
  4 - executives (managers, professional politicians)
  5 - farmers
  6 - tradesmen (enterpreneurs/small business).[3]

In this way 48 units (classes) - six from each republic and province - were classified. Units (classes) were classified in a five-dimensional space which is defined by the following variables of (ideological) consciousness:

1) Assessment of the democracy of (political) system (ASSEDEMO); it is actually a perception of the system on the continuum "the system is not democratic - vs. the system is democratic". We can thus speak about critical and uncritical attitudes to the system.

2) Egalitarianism (EGALITAR); assessed with reference to the distribution of income;

3) Civil (political) religiosity (CIVILREL); relation to communism, working class and ideological militancy. It is actually a matter of accepting or rejecting the core of the ruling (communist) ideology.

4) Relation to the monopoly of the League of Communists (COMMONOP); acceptance or rejection of the exclusive and monopolistic position of the ruling Party (the system with a single party or the one with more parties).

5) The idea of "Yugoslav identity" (YU); acceptance or rejection of the idea of "Yugoslav identity" as a solution for the national issue. We can thus speak about the relation to the concept of the unitarian state of Yugoslavs.

The first variable (ASSEDEMO) represents perception of the system (critical - uncritical attitude) and the others represent "normative" relation to the system, i.e. ideological answer to the question "What is right?" (see e.g. Therborn 1980: 18). The variables are organized as indices in the form of a five-level scale, where values 4 and 5 represent acceptance of the discourse contained in the variable, whereas values 1 and 2 represent its rejection. Values of variables for each particular class have been

determined on the basis of the share of class members who accept the story contained in each variable. The value of the variable thus represents the range of a certain attitude, value or ideological belief in each class[4].

In order to establish similarities and differences among social classes of the republics and provinces with reference to the presented variables of (ideological) consciousness, i.e. in order to establish how they were grouped (according to the "class" or "republic/province" principle), they were classified by means of **hierarchical clustering**[5]. Each particular social class in the republic or province represented a classification unit. There were no restrictions, so that, experts from Slovenia and farmers from Serbia could theoretically get into the same group. Initially variables were standardized ("z scores") and the diversity among the groups was assessed by means of Euclydian distance (in the five-dimensional space). The procedure of clustering was performed according to three methods: 1) maximum method (complete linkage); 2) Ward's method; 3) median method (Gower's method) (see Ferligoj, 1989). The results are shown by dendrograms (tree diagrams), which illustrate the basic groups of classes that were most similar regarding their (ideological) consciousness in the former Yugoslavia.

Examination of the dendrograms reveals that, according to all classification methods, Slovenian classes have been classified according to the "republic" principle and the classes of other republics and provinces, as a rule, according to the "class" principle (there are some deviations from this rule with Kosovo classes). In essence, it was discovered that exclusively Slovenian classes are present in one particular group, while at the same time we encountered groups that usually included identical classes from different republics and provinces (e.g. group of experts and executives from all republics and provinces except for Slovenia). Since almost two identical tree schemes were produced, the results lead us to conclude that a gulf existed between Slovenia and the rest of Yugoslavia as regard the ideological field during the second half of the eighties. These two dendrograms were obtained following the maximum method and Ward's method, which offer **classification into two groups**; one group including only the six Slovenian classes and the other group comprising the classes of other republics and provinces of former Yugoslavia (see Figure 1). Division into more groups also seems reasonable. Division into five groups is partcularily relevant, their structure being entirely consistent with the logic of the "republic" principle of clustering for Slovenia and the "class" principle of clustering for other republics and provinces, with the exception of Kosovo, where "province" principle is dominant. The main characteristics of five groups were as follows:

Group 1: primarily workers and officials from most republics and both provinces;

Group 2: farmers and tradesmen from most republics and both provinces (if there are only four groups, it is joined with group 1);

Group 3: the "Kosovo" group; it comprises four classes from Kosovo: peasants, workers, officials, executives;

Group 4: the group of experts and executives (if there are only three groups, it is joined with group 3);

Group 5: the "Slovenian" group; it includes all six classes from Slovenia, farmers, tradesmen, workers, officials, experts and executives (see Figure 2).
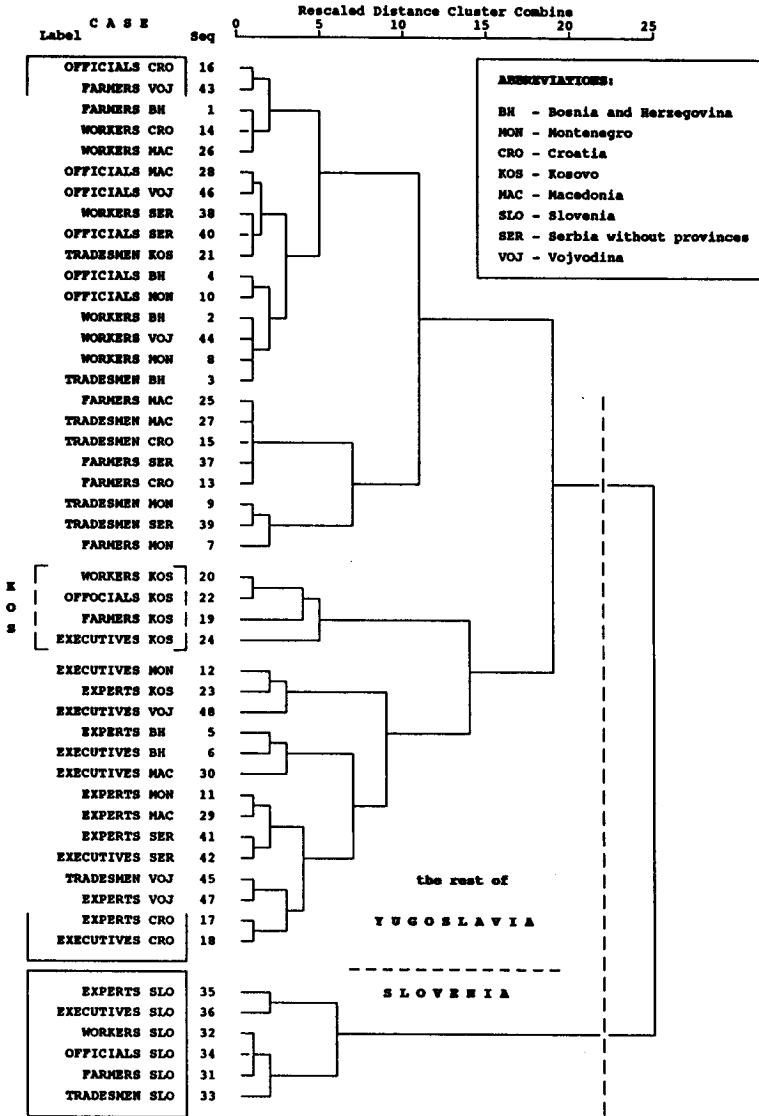
Figure 1: Tree diagram for the classification CLASS according to the variables of consciousness (according to Ward's method)
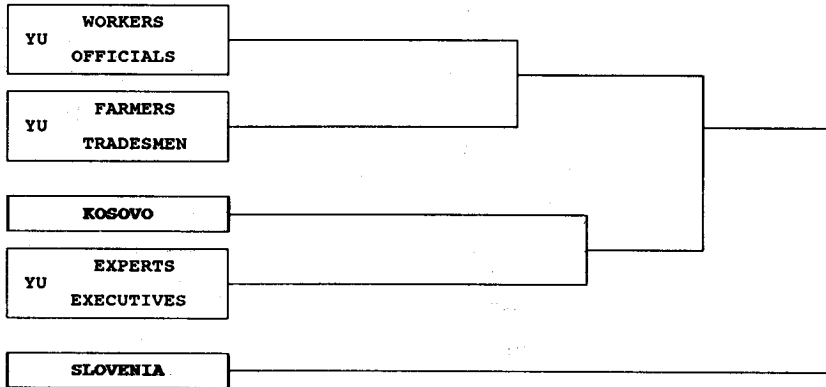
Figure 2: Cluster scheme of five basic groups of classes (synthetic presentations of the dendrogram from Figure 1)

With regard to the fact that identical results were obtained using the maximum as well as Ward's method, we can surmise that the division between the Slovenian classes and the classes of the rest of the former Yugoslavia is based on significant differences between particular Slovenian classes and particular classes of the rest of Yugoslavia, as well as on greater similarities among Slovenian classes themselves than in their relation to the classes in other republics and both provinces. This is also confirmed by the classification results according to Gower's method, although they vary, in that the division into two groups is not based on a Slovenia - rest of Yugoslavia dichotonomy. Nevertheless, there is still a "republic" principle of clustering concerning Slovenian classes only: all the Slovenian classes are classified into the same group, which also applies to the classification into more groups (up to 7).

Judging by the results of hierarchical clustering, it would seem that republican consciousness dominated in Slovenia, while class adherence held greater sway in the rest of the former Yugoslavia (with the exception of Kosovo which exhibited republican consciousness). Such a result corresponds to the so called "separatist" tendencies that were attributed to Slovenia and to the Albanian majority in Kosovo by the "Yugoslav" political (Communist party) elite in the eighties.

3.

The above analysis extends beyond classification, reaching perhaps the explana-tory level. The analysis, of course, remains on classification level, but it can also contribute to the clarification of causal analysis or at least represents a starting point for hypotheses that concern causal relations. Our case involves relations between three variables: adherence to republic or province and to class as the two independent

variables, and ideological consciousness as a dependent variable. We could actually deal with a kind of additive causal model which was described by E.O.Wright in the context of comparative research of class structure and class consciousness, wherein he outlined different possibilities for including macro-system variables (adherence to certain "national" systems) into causal models of explaining differences in the class consciousness of various societies (E.O.Wright, 1989: mainly pp. 18-20). It is actually a model which presupposes that, in addition to social position (class adherence), republic adherence **additionally** influences individual (ideological) consciousness (see Figure 3).
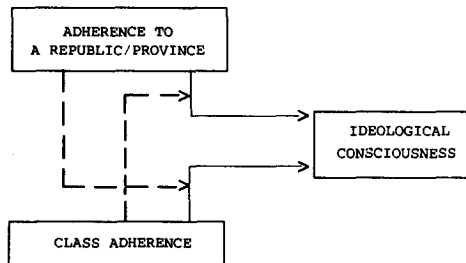

Figure 3: Additive causal model of determination of ideological consciousness with republic or province and class adherence

However, it is to be expected that there exists a certain interaction between both independent variables. This interaction is primarily manifested in the following two ways: a) as republic determination of the influence of class adherence on ideological consciousness (various effects of class adherence in different republics/provinces) and b) as class determination of the influence of republic adherence on ideological consciousness (various effects of republic/province adherence in different classes) (broken lines in Figure 3). These connections will not be investigated in detail at this point, however an outline will be offered to aid the attempt to interpret results on the basis of group classification.

The selection (identification) of units of classification is paramount. Researchers usually make use of units that have been selected in advance as research units (e.g. states, regions, local communities, individuals). In our case, units (persons) were classified according to two variables chosen before the procedure of hierarchical clustering. In this way, new ("analytical") research units were prepared. In the framework of causal analysis, those variables that represented a criterion of definition of (new "analytical") units of classification could be considered as independent variables, while those variables that served for classification of these new units could be considered as dependent variables. Inasmuch as we utilized several variables for the definition of units, the results of classification could indicate relative significance of these ("independent") variables as determining ("dependent") variables upon which

the hierarchical clustering was based. In essence, one can determine whether the units were classified into groups based upon the value of at least one independent variable. If this is so, and if the levels of clustering (e.g. gleaned from the clustering tree) are high enough, one can claim that the variable, upon which the groups were based, is a relevant determinant of variables (or at least the majority of variables) on the basis of which the units were clustered. This should then be ascertained through methods available for the establishment of causal relations.

In our case the classification results can be similarly interpreted. The key division was the division into a group comprising all six Slovenian classes (the "Slovenian" group) and a group consisting of all the other classes from other republics and provinces of the former Yugoslavia (the "Yugoslav" group). We can conclude that republic adherence was a more important determinant of ideological consciousness than class adherence; and was manifested primarily as the division between Slovenia and the rest of Yugoslavia. However, the dendrogram (see Figure 1) shows that the "Yugoslav" group comprised four subgroups on relatively high levels, which differed in respect to class adherence (see Figure 2). It follows that there is probably an interaction which could hypothetically be expressed in the following way: the influence of class adherence on ideological consciousness in Slovenia was not as great as elsewhere in the former Yugoslavia. This is, of course, only a cursory interpretation of the results shown here. Yet in our opinion it is sufficient in order to illustrate the applicability of the method of hierarchical clustering.

Such an interpretation and causal hypotheses were checked by means of other procedures. By using **analysis of variance** and **multiple classification analysis** we discovered that the effect of independent variables were significant in all 5 variables of ideological consciousness. What's more, in all cases, except for egalitarianism, the **republic determinant** is more significant. Likewise the significant effects of interaction were present (Table 1).

Clustering methods in the context of comparative analysis are not applicable only in order to classify and establish typologies of comparison units. When a corresponding

Table 1: Analysis of variance and multiple classification analysis of the influence of class and republic adherence upon ideological consciousness

	YU	COMMONOP	CIVILREL	ASSEDEMO	EGALITAR
REPUBLIC					
F	185,3	79,6	137,6	19,9	16,7
P	0,000	0,000	0,000	0,000	0,000
beta	0,33	0,22	0,29	0,11	0,10
CLASS					
F	18,9	15,5	36,1	5,4	119,4
P	0,000	0,000	0,000	0,000	0,000
beta	0,09	0,08	0,13	0,05	0,23
interaction					
F	3,0	2,0	2,3	1,4	1,7
P	0,000	0,001	0,000	0,045	0,009
R^2	0,11	0,05	0,09	0,02	0,06

analytical model is prepared, these methods could be useful in establishing a hypothetical starting point for the testing of causal relations or as a supplement to a more detailed interpretation of results of causal analysis. But these methods themselves are surely not sufficient, they must be combined with other procedures established for testing causal relations.

Notes:

1   It is a fact that in the former Yugoslavia the ruling (communist) ideology had a "privileged" status, which allowed practically no possibilities and no place for oppositional ideologies. This of course means that practically all individuals were subject to a discourse of the ruling ideology. One of the consequences is also the fact that individual ideological consciousness represented mainly a response to this discourse: acceptance or rejection of the ideological story.

2   The project was carried out within the Research Institute of the Faculty of Sociology, Political Sciences and Journalism by the research group that included the following experts: Vlado Goati, Peter Jambrek, Milosav Janičijević, Vlado Obradović, Stane Saksida, Ivan Šiber, and Niko Toš as the head of the group. The data were collected throughout the republics and provinces of the former Yugoslavia between June 1986 and June 1987 on the basis of identical questionnaires in the languages of the respective environments (Slovenian, Croatian, Serbian, Macedonian, Albanian). Respondents were chosen on the basis of a random sample of adult population for each republic and province separately. The collected data were organized in eight files with a corresponding number of units: Bosnia and Herzegowina - 2032, Montenegro - 745, Croatia - 3014, Kosovo - 1623, Macedonia -2064, Slovenia - 2056, Serbia without provinces - 2517, Vojvodina - 1925).

3   The theoretical argumentation of designating the applied classification as class classification will not be discussed here. It should only be mentioned that the starting point was the differentiation between two schemes of structuring the society; 1) according to the functional-relational scheme of social status social classes are classified as categories of role systems; 2) according to the hierarchical scheme of continuum of social status social strata are classified as categories of the system of the distribution of goods-statuses in the hierarchy of the distribution of goods. Classification of vocational categories can be comprehended as a classification within the functional-relational scheme.

4   All five variables have already been applied in the research on ideology and consciousness of social strata in Slovenia where they were also described in detail (Hafner-Fink, 1989).

5   CLUSTER procedure was applied within the statistical package SPSS.

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