

# Effects of Rank versus Category in Measuring Subjective Social Inequality

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## Abstract

In a postindustrial society with high levels of division of labor social differentiation occurs mainly in two ways: First, the subjective self-perception of the individual and second, an objective ascription of the individual's location in the status hierarchy.

In survey research the subjective perception of the individual's own location in the stratification system is either measured by a question confronting the respondent with categories of social stratification or by letting the person allocate him- or herself on an open ranking scale. In both instances, the researcher has no information about the criteria underlying the respondent's choice:

- With respect to the "categorical" measure the researcher assumes that the respondents understand the categories and are able to apply these categories to locate themselves in the stratification system.

- With respect to the open ranking it is implicitly assumed that status in society is identically perceived by each respondent, regardless of the respondent's own location within the status hierarchy.

The main topic of interest in this paper is to show

1. the differences between these two measures,
2. their relation to objective demographic data.

It is demonstrated first, that the choice of these methods influences the results, since respondents tend to assign themselves different positions on the ranking and on the categorical measure; second, that judgements on the ranking and categorical measure cannot be seen as equivalent indicators of subjective location within the society's social hierarchy because people locating themselves the middle category do not necessarily assign themselves a middle rank position but use the whole range of the ranking scale; third, that the choice of a category depends on the category label describing one social stratum. In contrast the choice of a rank position seems to indicate the relative social distance within the social reality being used by the respondent.

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## 1 Preliminary note

In survey research the subjective self perception of the individual's own location in the stratification system is either measured by a question confronting the respondent with categories of social stratification or by letting the person allocate her-/himself on an open - only at the end points verbalized - ranking scale. Neither in a "categorical" nor in an "open ranking" measure we do know exactly what is in fact measured because usually there is no information about the criteria underlying the respondent's choice for a specific category or a specific scale point. The process of "scaling" is left to the respondent with the "categorical" as well as with the "open ranking" measure:

- a) With respect to the "categorical" measure, the researcher not only assumes that the respondent understands the researcher's system of stratification categories that he/she is also willing and able to apply these categories in day to day life to locate him-/herself in the stratification system.
- b) With respect to the open ranking, it is assumed that the social economic status hierarchy in society is identically perceived by each respondent, regardless of the respondent's location within this space.

## 2 The instruments of "categorical" and "open ranking" measures

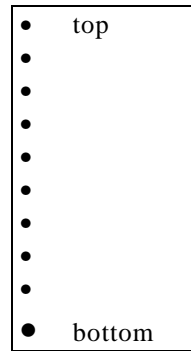
Our analysis includes two different "categorical" and one "open ranking" measure which are regularly used in national surveys in Germany.

measure A	measure B
lower class (LC)	lower class (LC)
lower middle class (LMC)	working class (AS)
middle class (MC)	middle class (MC)
upper middle class (UMC)	upper middle class
(UMC)	
upper class (UC)	upper class (UC)

**Figure 1:** The "categorical" measures.

The first categorical measure represents an ordinal scale of social strata from "bottom" through a visible "middle" to "top":

The categories are: "lower class", "lower middle class", "middle class", "upper middle class", and "upper class".



**Figure 2:** Ten point open ranking scale with verbalized end points.

This categorical measure is fairly abstract, because the categories do not describe specific - in the meaning of real - social categories or groups. The five-point categorical scale is symmetric with respect to the fact that there is an equal number of categories on either side of "middle class". It is assumed that the symmetry of the scale is not affected by labeling the categories.

The second categorical measure represents a mixture of a labeled five-point "bottom-top" scale: In contrast to the first measure, the second measure defines a specific social category or group: by labeling one of the categories as "working class" or in German: "Arbeiterschicht"; the blue collar workers as a group are addressed.

The categories are: "lower class", "working class" ("Arbeiterschicht"), "middle class", "upper middle class", and "upper class".

The term "working class" has a specific ideological meaning in Germany: "workers" are only "blue collar" workers and the label "working class" bears a strong resemblance to what Karl Marx described as "working class" in the meaning of "Proletariat". The German label "Arbeiterschicht" activates the ideological background of the class society or at least of class consciousness even without using the term "class".

The symmetry of the five-point categorical scale is disturbed by this ideological weight associated with "Arbeiterschicht" which stands at the position of "lower middle class" in measure A. "Arbeiterschicht" is not an abstract theoretical term but refers to the specific group of blue collar workers.

The third measure is what we call the "open ranking" scale. It consists of ten boxes where the box at the bottom is labeled "bottom" and the box at the top is labeled "top". The respondent gets a list with this scale and is asked to check the box to which she/he belongs.

The following results are based on a random sample of German citizens drawn from the population of a West German<sup>3</sup> being 18 years of age and older living in private households. This national survey from 1987 was conducted in the context

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<sup>3</sup> West Germany contains the area of the old Federal Republic of Germany before unification and the part of West-Berlin.

of the "Sozialwissenschaften-Bus" 3/87 (n=2000 face to face interviews) and was combined with the "International Social Survey Program" (ISSP) 1987. The ISSP questionnaire was given to n=1500 of the 2000 respondents as a drop off after the face-to-face interview. Altogether for our analysis were n=1405 interviews completed.



**Table 1:** Comparison of both categorical measures.

Count Row-% Col-% Std.Resid.	LC	AS	MC	UMC	Total
LC	18 48.6 62.1 18.5	16 43.2 5.2 2.3	2 5.4 0.3 -4.4	1 2.7 0.7 -1.6	37 100.0 3.0
LMC	10 3.4 34.5 1.3	176 60.5 57.0 12.3	105 36.1 13.6 -5.6	0 0.0 0.0 -5.8	291 100.0 23.2
MC	1 0.1 3.4 -4.0	113 14.3 36.6 -5.8	640 81.1 82.8 7.0	35 4.4 24.5 -5.8	789 100.0 62.9
UMC	0 0.0 0.0 -1.8	4 2.9 1.3 -5.1	26 19.0 3.4 -6.4	107 78.1 74.8 23.1	137 100.0 10.9
Total	29 2.3	309 24.6	773 61.6	143 11.4	1254 100.0
	100.0	100.0	100.0	100.0	100.0

Database: "Sozialwissenschaften-Bus" 3/87, ISSP 1987

"lower class" change to "working class" in measure B. That is forty-nine percent of people describing themselves as lower class stay there, but forty-three percent change to the next higher category "working class" if offered this label.

Sixty percent of those people judging themselves as "lower middle class" in measure A describe themselves as "working class" in measure B. Thirty-two percent of the "working class" people in measure B come from the "middle class" in measure A. This confirms the hypothesis that there is an ideologically based identification with the label "Arbeiterschicht" in the sense of the Marxist term of proletariat. But there are also respondents who do not want to describe themselves as being member of the "Arbeiterschicht". If the category "lower middle" does not exist, they prefer the label "middle class". This response behavior occurs in twelve percent of n=844 persons.

What do we learn from this different reaction of respondents to "lower middle" and "working class" in the two categorical measures?

First, it is obvious that of those respondents checking the category "working class" have the term "worker" as a label in their occupational work.

Thus, job status, label of category and subjective perception of location in the stratification system are highly correlated. While in measure A (containing "lower

middle class") about sixty percent of the "blue collar workers" choose the category "middle class", this proportion is reduced to forty percent in measure B (containing "working class"). Those occupational groups which do not belong to the "blue collar workers" avoid the category "working class" in measure B and choose the next higher category "middle class" instead, although they have checked "lower middle class" in measure A.

Second, if one looks for job autonomy which means here: how much autonomy of decision a person has in his or her job (an index for social status), it becomes obvious, that without the category "working class" nearly fifty percent of those people with lowest levels of job autonomy locate themselves into the "middle class" which can be seen from the corresponding proportions of measure A. In measure B there are only thirty percent of this low job autonomy groups left in the "middle class".

Although the percentage of agreement measure  $Kappa=0.541$  with  $T=20.681$  indicates at first sight a value significantly different from zero, this correspondence is not too promising, regarding that measure A and B aspire to measure the same thing.

### **3.2 Open ranking versus categorical measures**

Coming to the open ranking measure: Sixty percent of the respondents rank themselves above the middle area. Since there is no easy middle category on a 1 to 10-point scale most respondents try to locate themselves in the middle by choosing either category 4, 5, or 6, which contain more than two thirds of the respondents.

Comparing the subjective locations on the open ranking measure to those on two categorical measures it is obvious that

- a) respondents describing themselves as being "upper class" are most consistent in their judgements over all three measures,
- b) that the lower the self-ascribed stratification category in both categorical measures, the larger the range of ranks used. In other words: respondents who choose lower stratification categories tend to spread widely over the 1 to 10-point range of the open ranking measure. This is especially true for the "middle class" and "lower middle class" as well as "working class" in measure B or "lower middle class" in measure A. Even respondents describing themselves as "lower class" need eight ranking categories to assign themselves a "rank" in the "bottom-top" strata of society.

Thus, although there is some congruity of judgements between the ranking and the two categorical measures, the range of ranks within the categories is too large

to assume that both - ranking and categorical judgement - reflect the same process of subjective location in the social stratification system.

**Table 2:** Bottom-top ranking versus categorical measure A (lower middle class) and B (working class), in percent.

Category		UC total		UMC		MS		LMC/AS		LC		
Instrument		A	B	A	B	A	B	A	B	A	B	
Rank-Value		rank										
top	10	17	14	1	1	1	1	1	1	-	-	1
	9	50	57	2	2	2	2	1	1	-	-	2
	8	33	29	30	33	5	6	2	2	3	3	7
	7	-	-	39	46	15	14	3	5	3	-	14
	6	-	-	20	20	48	46	22	24	6	6	36
	5	-	-	5	3	18	18	25	25	17	10	18
	4	-	-	2	-	8	9	26	23	19	13	12
	3	-	-	1	-	2	3	13	12	17	23	5
	2	-	-	-	1	1	1	4	5	22	29	3
	bottom	1	-	-	-	-	1	1	3	2	14	16
											100	

Database: "Sozialwissenschaften-Bus" 3/87, ISSP 1987

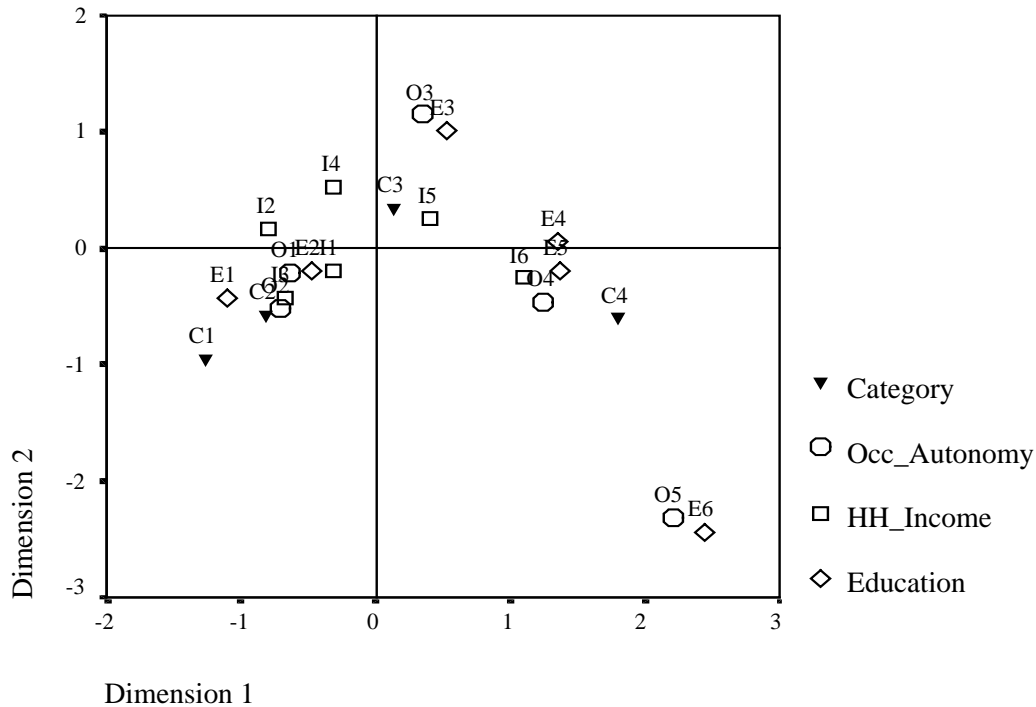
#### 4 Location by demographic variables compared to subjective perception. A correspondence analysis

The question is: Is there a common ordered space for the demographic characteristics as objective variables on the one hand and the categorical judgement as well as the location on the ranking scale on the other hand side? To test the hypothesis that there is a common space, a correspondence analysis has been conducted using the optimal scaling procedure of the SPSS-program. This procedure computes a canonical correlation between two sets of variables<sup>4</sup>. The first set consists of the demographic variables education (E), occupational autonomy (O), household income (I) while the second set consists of one variable: either the categorical judgement (C)<sup>5</sup> or the open ranking judgement (R)<sup>6</sup>. For the categorical judgment we restrict ourselves to the measure containing the "lower middle class" category (measure A).

<sup>4</sup> Database "Sozialwissenschaften-Bus" 3/1987: 784 cases who contains valid informations for all variables who are part of the Correspondence Analysis.

<sup>5</sup> C1=low (lower class), C4=high (upper middle class).

<sup>6</sup> R1=bottom, R9=top.



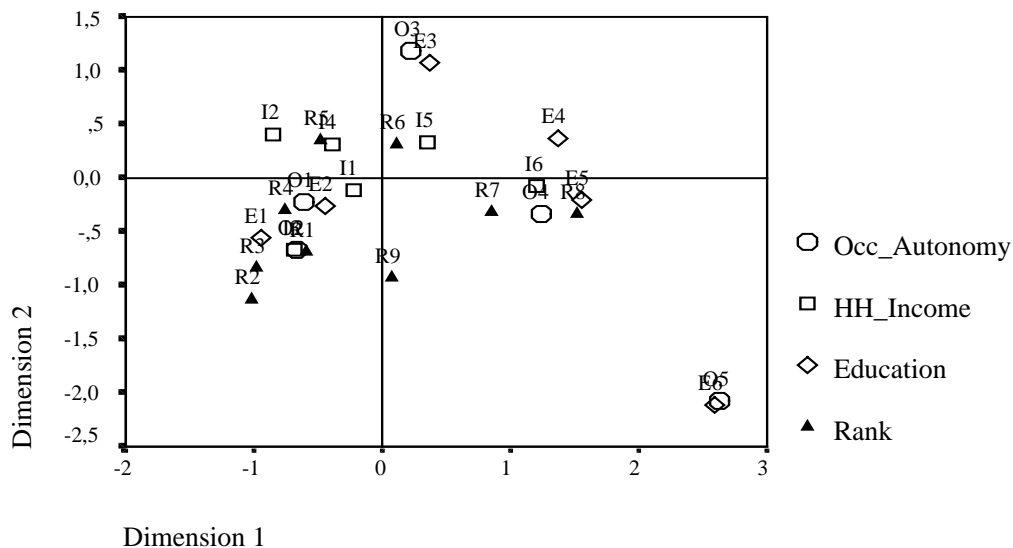
**Figure 4:** Common Dimensional Space of Education, Income, Occupation and Category Measure.

Figure 4 gives the picture of the relationship between our objective status indicators and the subjective perception in form of the categorical judgement. The categories of all variables together make up the classical "horse shoe"<sup>7</sup> form. This picture shows that the subjective (categorical) stratification judgement fits very well within the common space made up by the objective (socio-economic) stratification indicators.

The two axes of the diagram do not really reflect two dimensions. In fact, the x-axis (first dimension) represents a low to high socio-economic status dimension while the y-axis does not add substantial content to this information. The second dimension reflects the distance between the middle status characteristics and the extremes: the high as well as the low status criteria. Thus, the second dimension expresses a status dimension in terms of distance.

<sup>7</sup> A "horse-shoe" is the combination of a linear and a quadratic transformation of the same string of numbers. It seems that the second dimension is a quadratic transformation of the first dimension. This effect is often found in Correspondence Analysis when the first dimension is dominant.





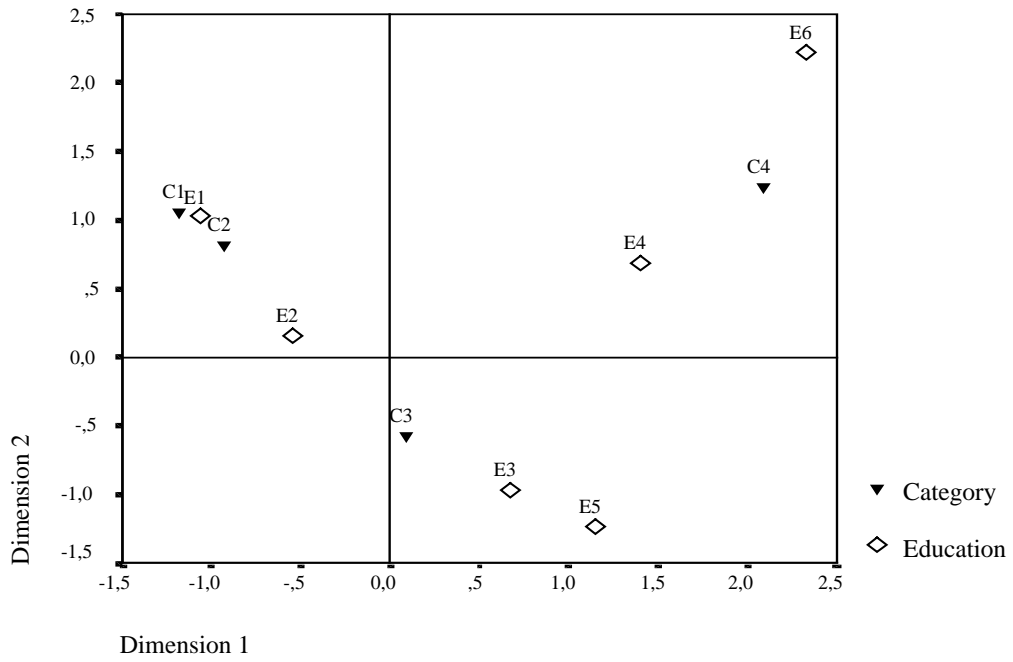
**Figure 5:** Common Dimensional Space of Education, Income Occupation and Rank Measure.

The objective characteristics are very well reproduced by the subjective categorical stratification judgement.

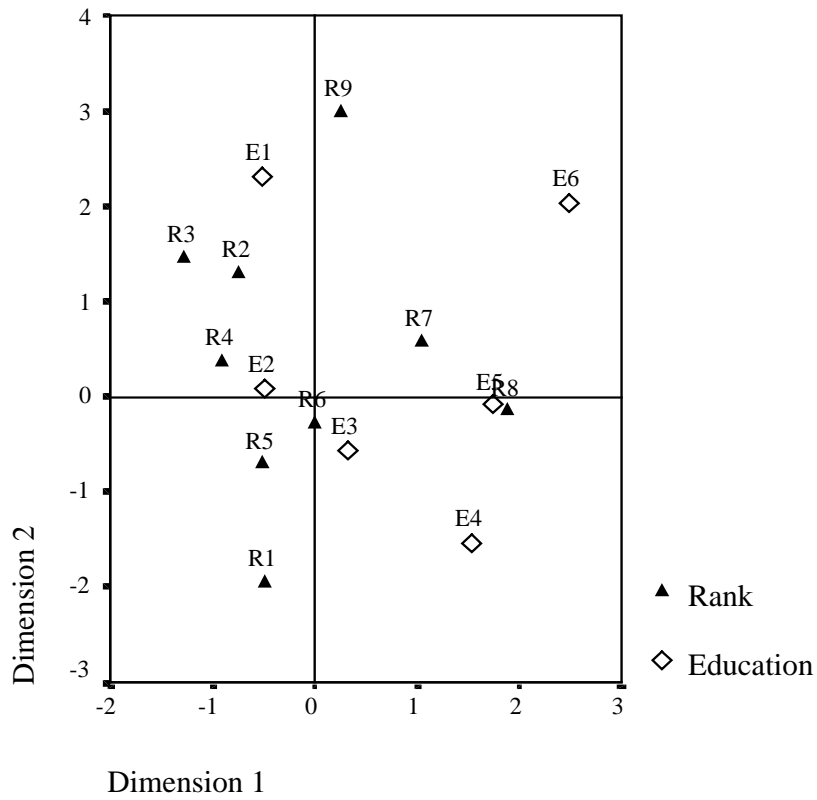
This means that if one wanted to construct an index to measure social stratification, one could use either the objective or the subjective indicators. The information we get from the optimal scaling solution shown in Figure 4 is that the objective indicators and the subjective stratification judgement reflect one dimension measuring social status.

In Figure 5 the subjective categorical stratification judgement is replaced by the judgement on the 10-point ranking scale. As in Figure 4, the first dimension reflects the direction from low to high socio-economic status indicators, while the second dimension reflects the distance of categories indicating high or low objective status for those categories indicating a status position in the middle.

This picture does not form a "horse shoe" and the categories of the ranking scale do not follow the order given by the objective socio-economic characteristics. From this plot we cannot derive an explanation whether the objective variables guide the respondents' ranking judgement or not. The rank categories spread somewhat "unordered" between the categories of the demographic variables.



**Figure 6A:** Education and Category Measure.



**Figure 6B:** Education and Rank Measure.

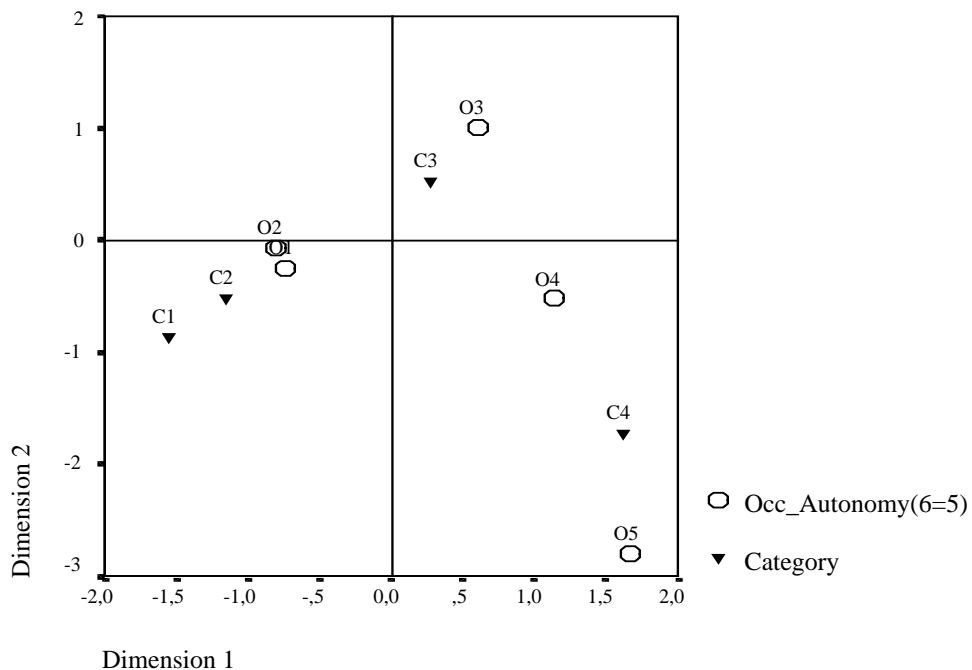
In constructing an index to measure the location in the social hierarchy of the society, the ranking scale should not be used, because it does not form a picture indicating unidimensionality.

To get an idea, which of the socio-economic status variables can explain best the ranking judgement, we plotted the categories of the ranking scale against the categories of each objective status indicator separately. For reasons of comparison we have done this also for the categorical judgement.

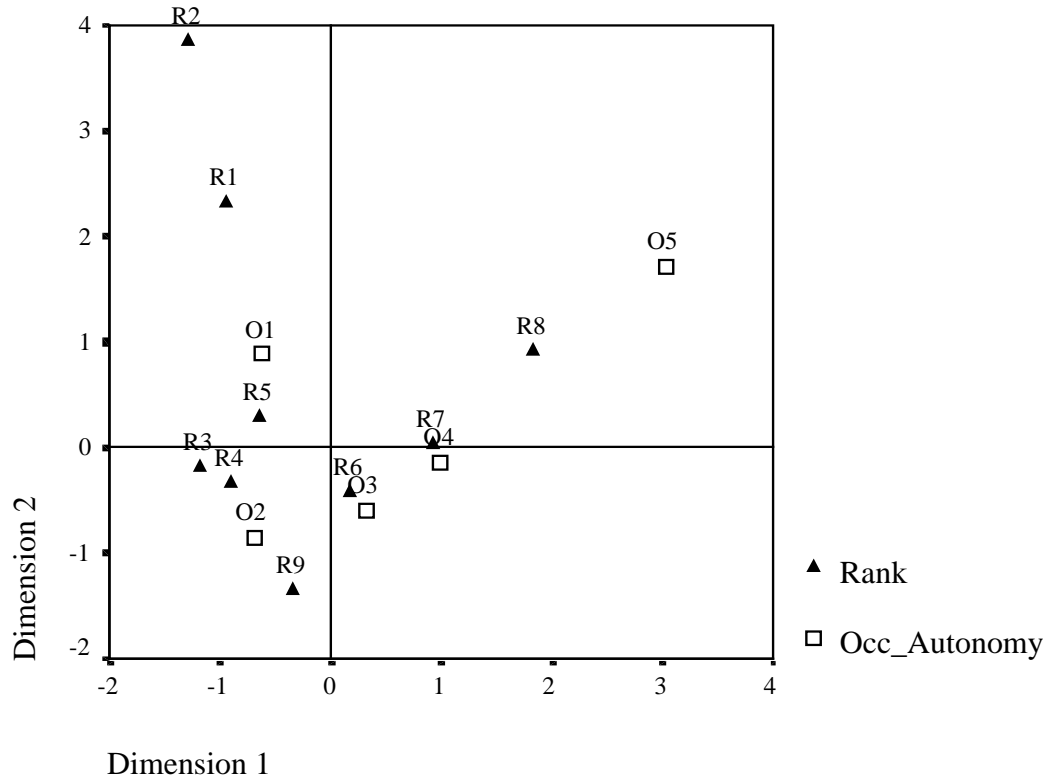
Figure 6 shows how well subjective perception of status can be displayed by education: In Figure 6A showing the relation between categorical judgement and education, the first dimension is again a high-low status dimension and the second dimension again displays the distance between the middle and the extreme categories. Categorical judgement and education form a very consistent curve in the common space.

That is not true for Figure 6B. Here the first dimension displays high to low education while the second dimension displays high versus low rank. There are two dimensions and the ranking judgement does obviously not fit into a space made up by the categories of education and therefore has not too much to do with education.

In Figure 7 education has been replaced by household income. Here we meet the usual pattern: categorical stratification judgement does very well reproduce the curve made up by the income categories (Figure 7A) while the ranking judgement does not fit into the space made up by the income categories (Figure 7B). Ranking therefore does not rely on the economic aspect of objective status of which income is an indicator.



**Figure 7A:** Occupational Autonomy and Category Measure.



**Figure 7B:** Occupational Autonomy and Rank Measure.

In Figure 8 income has been replaced by occupational autonomy. Again in Figure 8A subjective categorical stratification judgement has a very similar extension as occupational autonomy within the common space showing that categorical judgement refers to the prestige ascribed to autonomy of decision in the job.

In Figure 8B there is the first relation of ranking judgement to one of the objective variables: the ranking categories form a curve that is very similar to that formed by the categories of the occupation variable. Thus, ranking judgement seems to rely on occupational prestige.

How can we explain the obvious deviation of the ranking judgements from the objective characteristics? Of course there is a theoretical explanation for this phenomenon to which I come in a minute. First however, a formal explanation is approached by changing the question: we now do not ask for unidimensionality of ranking and objective characteristics - as we did with the optimal scaling procedure - but we instead ask for the predictive power the objective characteristics have for the ranking judgement. Thus, the ranking becomes the dependent and the objective characteristics become the independent variables. This sounds very much like a regression problem.

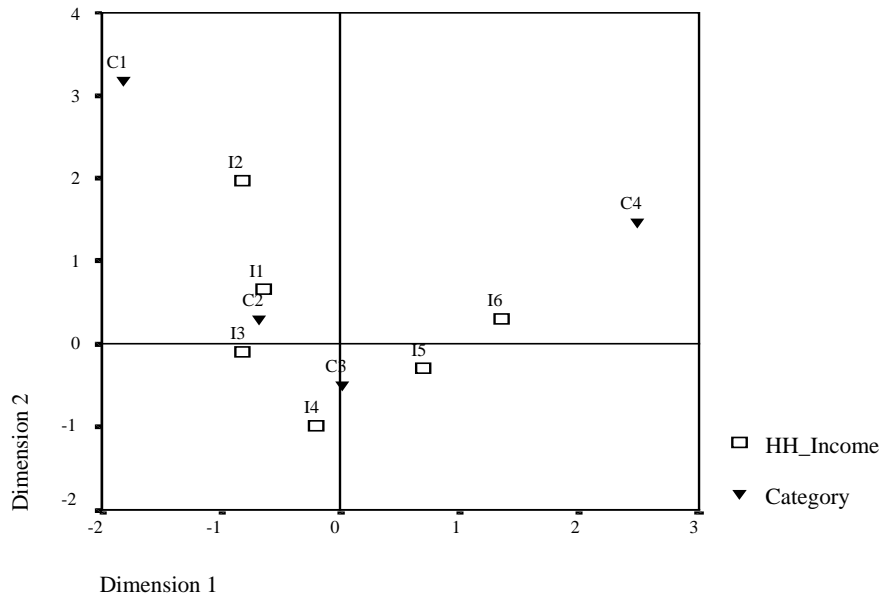


Figure 8A: Income and Category Measure.

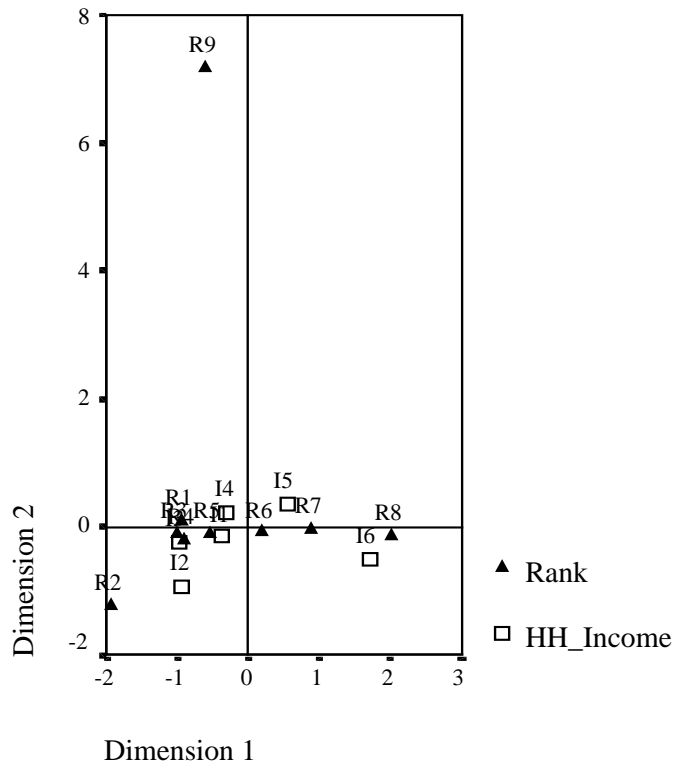


Figure 8B: Income and Rank Measure.

Since we were interested, however, not only in the amount of variance explained in the ranking judgement but in the differential attributes of the ranking judgement compared to the categorical judgement we approached this question by conducting a multinomial logit analysis.

In the multinomial logit analysis variables can be declared either as multinomial or as ordinal. The analysis gives coefficients for each category of all variables in the model showing the amount of change a specific category produces in the dependent variable - change compared to the omitted category which we chose to be the lowest category of each variable. To discuss all these coefficients would be too much for this presentation. Therefore we restrict ourselves to the point that has the most interesting information at least for us.

The multinomial logit analysis was done for both subjective stratification judgements as dependent and the objective characteristics as independent variables. In a first step the dependent variables were declared as multinomial, in a second step they were declared as ordinal variables to see the difference between these two models and to see if both dependent variables fit to an ordinal model.

**Table 3:** Explanatory power of objective characteristics.

	df	Log-Likelihood	Pseudo R <sup>2</sup>	$\chi^2$	
Multinomial	Category	-620.6599	0.1909	292.87	60
Logit Model	Rank	-1221.0016	0.1180	326.75	60
Ordinal	Category	-647.75	0.1556	238.69	20
Logit Model	Rank	-1305.4966	0.0570	157.76	20

Database: "Sozialwissenschaften-Bus" 3/87, ISSP 1987

Table 3 gives the summary measure of the Pseudo R<sup>2</sup> of the four analyses. In the multinomial model the categorical judgement has an R<sup>2</sup> of .19 while the ranking has an R<sup>2</sup> of .12. The R<sup>2</sup> gives the amount of explanation gained by the introduction of the independent variables into the model compared to a model containing only the constant. This Pseudo R<sup>2</sup> is not equivalent to the amount of explained variance it just reflects the predictive power of the specified model.

Thus, the objective characteristics have more predictive power in explaining the categorical judgement than in explaining the ranking judgement.

If the variables in the model are specified as ordinal, the Pseudo-R<sup>2</sup> again informs about the predictive power of the independent variables. But in this case the fit of the model informs additionally about the character of the dependent variable: if the fit expressed in the Pseudo-R<sup>2</sup> is good, that is, if the gain of the coefficient compared to a "only the constant including model" is significant, then

the variables correspond to an ordinal scale. The values for the Pseudo-R<sup>2</sup> reveal that this is the case for the categorical judgement which could be expected from the former analyses. The ordinal model fit for the ranking judgement, however, is much smaller, indicating that the ranking does not obey an ordinal device. That is, the ranking does not reflect real world.

Categorical judgement is easy because respondents have clear guidelines how to judge. Even if we often do not know what they think in choosing a category label describing their social stratification position they can do it. And they do it in a way that follows the ordinal scheme of the objective variables.

Ranking judgement, however, implies not only cognitive but also socio-psychological processes. People may locate themselves in the middle of the stratification categories but they compare themselves with others in their environment. Ranking implies this comparison and also implies for some the wish not to be at the very bottom. For many people it is very important to have others who are in a lower position regardless of how low the own stratification position is. Thus, with ranking we measure social distance. But social distance does not necessarily follow the implicit ordinal device contained in the objective characteristics. Therefore the pictures show a wide unordered spread of ranking over the space made up by the objective variables.

Therefore, ranking does not fit the ordinal model very well. Social distance can exist within a categorical stratification position.

## **5 Summary and conclusion**

The three measures of subjective stratification location do not assess the same perception of respondents about their location in the social structure of society. In contrast, the comparison has shown the influence that the type of measure exerts on the results: it depends on the instrument whether respondents assign themselves a higher (ranking measure) or lower (category measures) social position. The judgements on the ranking and categorical measure are far less correlated (measure B-rank:  $r=0.50$ ; measure A-rank:  $r=0.51$ ; measure A-measure B:  $r=0.68$ ) than one would expect of measures aspiring to measure the same things. People locating themselves in the middle category do not necessarily assign themselves a middle rank position, but use the whole range of the ranking scale.

Additionally, the choice of a category depends on the category label describing the social stratum as could be shown by comparing measures A and B. The reason is that "Arbeiterschicht" is a strongly loaded term from an ideological point of view, having nothing in common with the categories or rank positions of the other two measures. People who do not have the term "Arbeiter" in their occupational description choose the category "Arbeiterschicht" significantly less.

While measures A and B display - if not an identical - at least a societal reality, the choice of the rank positions seems to indicate a respondents' relative social distance to his/her social surrounding. Rank seems to have less than categories to do with the classical status variables as education, occupation and income. Thus, rank seems to be an indicator of individualization because individuals do not use the traditional characteristics of social inequality but have created themselves their own "pattern".

The conclusion is, that the three measures cannot be considered as functional equivalents of each other because each of them touches a different subjective reality. If the research objective is a measure assessing societal reality best fitting the respondents' objective situation, it is strongly recommended to apply a symmetric categorical scale ranging from "low" to "high". However, the suspected consequence of a categorical scale might result in response behaviors corresponding to a learned pattern.