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**The Social Representation as a consensual
System and correlation analysis**

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The Social Representation as a consensual system and correlation analysis.

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Abstract: This paper discusses the problems with the standard correlation analysis in the context of the research on social representations as consensual systems. Some first steps to find a central tendency of such consensual systems are given. Furthermore, the general problem of two different aspects of a social representation are discussed : its "representativeness" as a qualitative characteristic of a consensual system and its most characteristic reaction on a quantitative reaction scale.

1. An example

In our research of the social representation of love and partnership (Kraft & Witte, 1990, 1992) we used a questionnaire and then factoranalyzed the correlations to get the main dimensions . Afterwards, we compared the means of these dimensions between reference groups as the units of social representations. What we observed was that a few items were highly skewed and the variability was strongly reduced. Thus these items had to be eliminated before the correlation analysis because if there is no variance there can be no covariance (correlation). However, it was these items which expressed the consensual social reaction of our sample and they should not have been eliminated. This kind of procedure seems to be inadequate for the analysis of social

representations, because the generally shared view might be the best indicator of a social representation and this kind of elimination seems to be incompatible with the theoretical concept being tested. Thus we have to discuss the use of correlation analysis as a method for the analysis of a consensual system like social representation.

2. Some well-known problems of correlational analysis

The use of correlations and factor analysis is the traditional method of differential psychology , especially of the research on intelligence structure. In combination with this research the following problems have been discussed intensively :

a) Difficulty factors and their influence on the correlation: which means that an asymmetric distribution leads to a regression function which is not linear so that the highest possible correlation is not one. Thus the main assumption behind the correlational analysis is the normal distribution, because only then does the correlation in the traditional sense give an indication of the dependence between two variables.

b) The restriction of the variance compared with a normal distribution underestimates the dependence of two variables, because the bivariate distribution looks more or less like a circle . Usually, our statistical analyses depend on the

multivariate normal distribution. Only under these conditions are the correlation/regression and factor analysis statistically justified. Although these methods are to some extent robust against violations, by and large, correlational analysis is incompatible with the theoretical concept of social representation (Farr, 1993, 1993a).

3. Statistical consequences of the general ideas about social representations for one reference group

The main idea is that social representations are socially shared viewpoints of a reference group and, unlike attitudes, are not individually differentiated reactions (Jaspars & Fraser, 1984). Thus the central tendency of the reference group is the theoretically adequate parameter of a social representation. Furthermore, the inter-individual differences are the error of this parameter from the perspective of the social

representation. The aggregate level is different from that of attitude research, where the inter-individual differences, not the central tendencies or means, are the theoretically relevant parameters. One consequence of the concept of social representation for the univariate distribution is that it is not normal, rather, sometimes multimodal depending on the number of reference groups in the collected sample. If there are only a few categories of the rating scale used in the

questionnaire the univariate distribution should be very skewed with a mode on one side of the scale. The result is that the frequency distribution of the categories used looks more like a Poisson-distribution than like a binomial distribution with a symmetric shape. This is only the statistical manifestation of the assumption that there is a conformity or socialization process in a reference group producing a uniform reaction or viewpoint. The individual freedom has been restricted under the perspective of a social representation in homogeneous groups. Thus the arithmetic mean is not the most characteristic parameter of this kind of distribution. Furthermore, the median of the distribution, also sometimes used, is as well not the most characteristic description of the distribution, because all individual values are integrated into this descriptive statistic. What is needed is the mode or some modal description of the distribution. One suggestion is to use the two most frequent categories of the distribution if they contain at least three quarters of all reactions of a homogeneous reference group from a scale of, e.g. five, categories often used in questionnaires. These two categories should be neighbored. Then the weighted arithmetic mean of these two categories is used as a descriptive parameter of the distribution which characterizes the social representation of the whole reference group.

In general, only these items should be used which are skewed in a homogeneous reference group, because only these items are

indicators of a **social** representation.

This strategy is contrary to the one normally used in a correlational analysis where skewed and restricted items are eliminated.

The next problem is how to combine items into a scale to acquire a more abstract variable as is possible with factor-analysis based on correlations. The idea is simply that a fixed percentage of the sample should be represented by the global index. The main assumption is that the statistic of this index has to be a central parameter of what is **socially** represented.

Now we have to define what is meant by being socially represented : How to differentiate a social representation from an attitude on more statistical terms ? Until now we have had no criterion to identify something like a social representation. Of course, there is no clear-cut definition of a social representation as opposed to an attitude. However, we need an idea of what we should look for if we are also to talk about the concept of social representation on statistical grounds. The empirical parameters for the identification of a social representation in contrast to the concept of attitude have to be specified.

Obviously, the shape of the distribution should be different under both concepts: perhaps a Poisson-distribution with significant deviation from normality for social

representation, and quite the opposite for the attitude distribution.

The idea is, taking as an example a five-category scale, that 75% of the sample should have chosen one of the two extreme categories on one side of the item-scale, if this item is to be taken as an indicator of a social representation in a reference group. Thus the universe of content operationalized by different items is socially represented by the skewly distributed items and not the normally distributed. Now the elimination process of the items is contrary to the usual method employed with the concept of attitude, in which the correlational analysis is possible.

The next question is whether the combination of items into a more global index of this universe of content satisfies the criterion of social representativeness. One possible construction is that two thirds of the sample be represented by this index. This is a qualified majority of the sample. Of course, there are many ways to construct such an index. Here a simple way is given :

1. Rescale each answer in such a way that a subject gets a "1", if it is on the majority side of the scale and a "0" otherwise for every item. If the global index of the items is constructed there have to be at least 66% of the reactions coded as a "1".
2. If this criterion is not fulfilled then eliminate the item with the fewest answers coded as "1". Continue until the

criterion is fulfilled. It might be that there are two different indices which separately fulfill the chosen criterion. Then the universe of content is socially represented by two dimensions.

The result of this procedure is the identification only of what has been called a social representation in one reference group. It is still a qualitative analysis of the concept of social representativeness and gives no quantitative expression of the central tendency as a measure of the average reaction on the rating scale. How to find such a quantitative measure as the most characteristic reaction (MCR) of the reference group ? One way is to take the subsample of Ss who have been coded as "1" and determine the arithmetic mean of this subsample as the most characteristic reaction on the rating-scale for this item. The global index is then best measured by the mean of the most characteristic reactions of the items, if the items are poled in the same direction. This is a quantitative measure (or measures) for a universe of content characterizing the social representation of a specific reference group. The next problem is to compare two reference groups in the same universe of content.

4. Statistical consequences of the concept of social representation for the comparison of two reference groups

There are two questions to be answered if two reference groups

are to be compared in one universe of content :

a) Is this content also socially represented in another reference group, or is it only a kind of attitude ?

It is the qualitative question concerning the consensual representativeness of a universe of content in two reference groups, not concerning the quantitative expression of the social representation.

b) The second question now concerns the quantitative comparison of the two most characteristic reactions in two reference groups.

The first question deals with the skewness of the distribution on the same items in two different reference groups. However, this skewness may be on the other side of the rating-scale with the same amount of subjects coded a "1." Then the representativeness is equal: in both groups this content is typically polarized only in the other direction. This kind of polarization is a question of its own . It gives a hint of the social support in the reference group being something fundamental in this group. Of course, there are several ways to compare two distributions. If it is theoretically accepted that the two most frequent categories are relevant for the determination of the representativeness then the percentage of the Ss coded with a "1" is taken and tested for equality . If there is more than one item, the two distributions of the percentages for all items can be tested at once.

The next qualitative question of the building of global

indices has to be answered . The problem is that of the dimensionality behind the pool of items. One begins with a specific reference group and its global indices. Taking the same items, the global index and its percentage of subjects coded as "1" in the two groups has to be compared. If there are significant differences then begin with the other group and build global indices. Afterwards compare these percentages in the same way. There might be one result that the second reference group is subsumed under the first but not the first under the second. This kind of relationship might be asymmetric. What does this mean ? The more homogeneous the reference group the less probable that it is an element of another group. Thus, this reduction of complexity to one global position of the majority creates a fact of self-evidence, which generalizes over the whole universe of content. Perhaps these positions are the central values of a culture or subculture. They are premises of a communication or negotiation and, usually, not to be discussed, because they are self-evident. Sometimes such social representations are the reasons for a fundamental misunderstanding between groups. This qualitative research on the representativeness is itself very interesting, as it can describe the matters of self-evidence in a culture , independent from the quantitative results on the rating-scales.

If now the most characteristic results for a reference group

on the quantitative scale have to be analyzed, then one kind of standard deviation, the variance of the individual positions around the most characteristic reaction (MCR), has been eliminated, because we have concentrated on a reduced subsample to determine this measure, mainly for theoretical reasons. Then we only have the variance of the most characteristic reactions (MCR) . This variance might be an estimation of the usual variation used as a comparison level for the difference between the two MCR's of the reference groups. There is, however, one problem : if the formulation of the items is inverted so that sometimes a positive and sometimes a negative reaction has the same meaning, then the variance is artificially high . Thus the variance depends on questionnaire construction which is theoretically not acceptable. What is the consequence of this discussion ? The relevant difference between two MCR's has to be fixed theoretically . The problem is getting an estimation of the random variation so that this influence can be eliminated before a difference could be interpreted as statistically significant. Perhaps, there is a way to define a relevant difference and then to determine the number of Ss to be collected as a sample to get a stable estimator of the reference group. One idea is to go back to classical approaches of power analysis. The sample size could be determined after the fixation of the confidence level and the relevant effect size (Cohen,1977). The estimation of the

sample size is conservative, because this approach is based on normal distributions and also because the standard deviation is usually reduced in skewed distributions so that the effect size (the difference of two means divided by the common standard deviation) is underestimated. If only large effects are accepted ($d = 0.80$) and the confidence level is $\alpha = \beta = 0.05$ (one-sided) then the sample size of each reference group should be 35. This large effect means that the highest 66% of one reference group exceeds the lowest 66% of the other group. As a general estimation of the standard deviation it is assumed that the frequencies on the category-scale are distributed as an ideal normal distribution with the mean in the center (e.g. for a 5-categories scale from 1 to 5 the mean is 3 and the standard deviation is $s = 1$). If the scale has more categories, the standard deviation increases. One determines the standard deviation by estimating the frequencies of the categories for an ideal binomial distribution at $p = q = 0.50$. Under the 5-categories scale we got $s = 1$. Thus, if the sample size from each reference group is at least 35, each difference greater than .80 is seen as quantitative different in the two reference groups. An increase in sample size should not be used for a reduction of the critical difference. Only the clear-cut differentiation in a quantitative sense is theoretically relevant if a social representation is the theoretical construct as opposed to the attitude concept.

5. Final remarks

The research on social representations is, to some extent, contrary to the attitude research. The latter concept looks for individual differences and the former for individual homogeneity. Attitudes are individual parameters, whereas social representations are characterizations of a reference group on a more aggregate level. The individual variance is to be explained or used as a prediction for individual behavior in the first concept. In the second, the individual variance is considered error variance, and such items have to be eliminated. One looks instead for skewed distributions and reduced variances. The consequence is that the traditional and common procedures are inadequate for social representations as theoretically presented. Alternatives to the classical correlational analysis have to be found for a qualitative and quantitative analysis of this concept. Two questions arise as a result: one concerning the existence of a social representation in a universe of content and the other concerning the quantitative differences between two reference groups. I have offered some basic suggestions for the analysis of these two questions. Of course, better procedures will be developed in the future. Primary, however, is that methods and theoretical concepts must be compatible if our empirical research is to lead to interpretable results. Methods must not dominate theoretical concepts. Some simple ways have been

given to find a better approximation between concepts and methods.

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