Political Decision-Making in a Risk-Taking Situation: Swedish Local Councils in the Face of Amalgamation

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1. Introduction

Empirical studies of decision-making have usually followed one of two courses. One leads to case studies. Most often isolated cases are studied, at best many cases. These studies have often been extremely penetrating and illustrative and have formed excellent sources for the generation of hypotheses. The difficulty of generalizing from case studies is, however, obvious. The other course leads to classroom experiments around decision situations. The experimental technique has many obvious advantages. It has, however, also a basic weakness which is particularly pronounced in the case of reproducing collective decision-making in an experiment within a firmly organized framework. It is almost impossible to make the experiment realistic.

It has been possible to follow a third course in this study, which has been carried out within the framework of the Swedish Local Government Research Project (regarding the research programme see Westerståhl 1967, 1970). In this case a large number of decisions – about 950 – are studied in terms of positions taken by collective decision-makers to one and the same type of proposal under conditions which are to a large extent known. Theoretically, it should be possible to satisfy to some degree the demands both for realism and generality in the study of decisions. The investigation is not yet completed and further analyses are planned. It has, however, seemed to be of interest even at this stage to publish certain results. Corresponding research conditions are to be found elsewhere, models and methods of analysis may need to be discussed.

Thus the study concerns the attitudes of the local councils to the so-called municipal bloc reform decided by Parliament, or more correctly to the suggestions for municipal bloc organization drawn up by the county administrators as a consequence of Parliament's decision.

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Thus the study concerns the attitudes of the local councils to the so-called municipal bloc reform decided by Parliament, or more correctly to the suggestions for municipal bloc organization drawn up by the county administrators as a consequence of Parliament's decision.

The study is based on official material, which can be divided into three categories: 1) Legislation and preparations for legislation on the reform and its execution (reports from committees and authorities), 2) Ecological data on the communes, 3) The official standpoints of the communes concerning the County Administrative Boards' suggestions on the bloc plan.

The first-mentioned material is used to establish the aims of the government with the reform and the principles according to which the reform should be carried through. The second part of the material will then be used to describe how the County Administrative Boards' application of the principles has occurred in the choice of bloc size and central communes and to describe certain local political consequences, which the reform involves for different types of communes. The third part of the material has been used to construct the dependent variable, i.e. the communes' attitudes or choice of strategy.

The presentation itself will have the following layout. Section two accounts for the origin and content of the principles of the reform and in section three the County Administrative Boards' application of these is described. Then follows in section four a discussion of the decision problem. This section also contains an analysis of certain consequences which occur as a result of the reform's execution. In section five the type of decision problem is expressed more precisely and the section is completed with the formation of a theory. The generation of hypotheses follows in section six, and, finally, sections seven and eight contain accounts of results. The variables used are described in a short appendix.

2. The Establishment of the Principles

The first boundary changes in Sweden were carried out in 1952. The number of municipal units was thereby reduced from about 2,500 to 1,037. The reform was justified mainly by the demands placed by modern society on local public service, which were so great that the smallest local units would not, in the long run, be able to administer and bear the increasing obligations. The reform was executed in such a way that the rural districts were grouped into so-called "great communes". Towns and urban districts were not affected by the reform. A population of 3,000 was set as a minimum aim. After 1952, however, there was still about a third of the Swedish communes with a population below this figure and at the end of the 1950's continuous urbanization had raised this number even further. In 1959 a committee was appointed to investigate the requirements for a new boundary reform.

At the beginning of 1961 their report appeared. Here it was observed that there existed a close connection between the size of the commune and the trend in population. It was further found that the trend in population was also closely allied with industrial changes in such a way that the agricultural districts had a greater de-population than more industrialized and urbanized communes. In the

same way it was shown that the agricultural districts had the lowest tax potential, thus proving that it is structural rationalization which lies behind urbanization and migration. The committee expressed the consequences of these conditions in the following way:

"An unfavourable trend in tax potential together with a diminishing population year after year must have a deterrent and, in certain cases, quite paralysing effect on municipal activity. However competent the local leadership it cannot in the long run prevent this development, if the community's economic resources do not give room for initiative and an active local policy. Under such conditions there is a clear risk of retardation in local standards, which in its turn further hastens the commune's decline." (SOU 1961: 9, p. 123).

The commnttee also confirmed that society's obligations demanded appreciably greater economic, personnel, and area resources during the 1960's and 1970's than had been reckoned with before the 1952 reform.

In order to secure that the new division of communes would lead to a long-term solution it was felt that towns and conurbations should not be excluded from the reform. Instead one should endeavour to construct the new local unit with a conurbation as administrative centre (central communes), which would constitute a centre for both public and private services.

The committee also had a provisional division of the country drawn up, to which the economic-geographic theory of functional regions was applied with strictly scientific rules.[1] This provisional division showed that a minimum size of 8,000 inhabitants per local bloc would ensure that practically all the units achieved a stable population trend. Since this figure correlated well with the demands for personnel resources it was also put forward as a primary aim for the reform.

Thus we can summarize by saying that three principles were suggested as basic to the reform:

1. The future local units should have a minimum population of 8,000.
2. This figure should apply to the projected population for 1975.
3. The boundaries should be adapted to the functional regional pattern.

Certain exceptions to these principles could be accepted in extremely sparsely populated areas as in the North. Neither was it considered that the region principle could be correctly applied around the largest towns, where extremely large blocs would otherwise be the result.

It was further suggested that the reform should be carried out in stages. First a national plan should be set up after industrial-geographical investigations had been carried out and after each local council had been given the opportunity to air their opinions. Then special liaison committees within each bloc should be formed with representatives for each local council. This committee would prepare a final amalgamation. Each particular local council would be allowed to decide the timing of this independently.

In the spring of 1962 Parliament approved the committee's suggestion practically

unchanged. The majority of the People's Party (Liberals) and the Communists voted for the Government's proposition, while the Centre Party and the Conservatives voted against.

3. The Application of the Principles

Immediately after Parliament's decision the country's 25 County Administrative Boards could begin the work of drawing up the bloc plan. Preparations had already been made for the economic-geographic studies of spontaneous functional boundaries. During the summer and autumn of 1962 a widespread activity proceeded over the whole country at regional and local levels. In each county repeated conferences were held between county administrators and local representatives, and at the turn of the year practically all the County Administrative Boards had worked out a proposed bloc plan for the respective county. All the communes were given the opportunity of taking an official standpoint on the bloc alternatives suggested.

Our study is based on an analysis of these standpoints. The County Administrative Boards' suggestions resulted in 334 bloc-formations altogether. The following Table shows these distributed according to principles one and two. We find that 68 blocs or about 20 % have achieved a population figure under 8,000 inhabitants. Of these, however, about two-thirds have positive or balanced population trends.

Table I. The relationship between size and population trend among the total number of bloc-formations, which were proposed by the County Administrative Boards. Percentages

Inhabitants / Population trend	< 6,000	6,000-7,999	8,000-9,999	10,000-14,999	15,000-29,999	30,000-59,999	⩾ 60,000
Positive	67	51	25	33	55	85	100
Balanced	0	11	17	14	21	12	0
Negative	33	38	58	53	24	3	0
Sum of percentages	100	100	100	100	100	100	100
Number	15	53	52	81	80	41	12

The application of the administrative centre principle meant that the communes, according to the decisions of the County Administrative Boards, would be proposed to be placed in one of four "status categories":

1. Status as independent (the commune not to be affected by the boundary changes).
2. Status as a central commune in a uni-polar bloc.

3. Status as a central commune in a multi-polar bloc. (This category will be omitted in our further presentation.)
4. Status as a fringe or peripheral commune.

The criterion for being appointed as a central commune was that the commune had sufficient non-public service functions. The most important measure of this was the index of centrality.[2]

Table II. The relationship between index of centrality and the status of the commune in the proposed bloc-formations. Percentages

Index of centrality / Bloc-status	0.0 0	0.1-2.5 1	2.6-4.5 2	4.6-6.0 3	6.1-7.5 4	7.6-10.0 5	10.1-20.0 6	>20.0 7
Independents	0.3	02	06	14	07	02	01	08
Central communes	0	13	22	48	80	98	99	92
Peripheral communes	100	85	72	38	13	0	0	0
Sum of percentages	100	100	100	100	100	100	100	100
Number	316	96	188	101	60	50	80	13

Table II indicates that the probability of being appointed as a central commune increases with rising values in the index of centrality. The probability of being proposed as independent, on the other hand, increases only moderately and, over a certain level, it begins to decline.

4. The Decision Situation

Both normative and descriptive decision theory seem to assume that the following components are contained in the decision. (Bross 1953, Wilson & Alexis 1962).

1. The decision-maker(s).
2. Awareness of alternative courses of action.
3. Prediction of the consequences of alternative courses of action and their probability (future states of affairs).
4. Evaluation of the consequences against (a) more or less clear goal(s).
5. Application of a decision criterion.

The commonest definition of a decision as "a choice of one course of action among several possible ones" links the decision-making itself to point five.

We shall, in what follows, attempt to discuss the situation being studied against the background of these points. In the context certain references are also made to

general decision theory. For obvious reasons these can only be fragmentary but should nevertheless give some illustration of the requirements for an analysis of this kind.

1. As regards point 1, there often exists a distinction between individual decisions and group decisions. Group decisions are often regarded with respect to aspects of conflict, power, and communication within the group (Golembiewski 1965) but also as individual decisions in a functional sense. (Luce & Raiffa 1957).

The decision-maker in this analysis is a local council. It is thus a question of a group decision. What assumptions can then be made about the decision-maker? Are councils always unanimous in their decisions? A survey of the frequency of conflict has shown that this is not the case.[3] In 16 % of the councils conflicts have arisen in the form of voting and/or reservations. A closer analysis of these cases of conflict has shown that the disagreements follow both regional and party-political lines. The picture of the political conflicts shows that disagreements exist to a certain extent between the socialist and "bourgeois". In a third of the cases it is a question of a pure bloc conflict. However, we cannot state generally that the decision-maker comprises either a non-socialist or a socialist majority constellation. And we cannot definitely say that the absence of formal conflict in 84 % of the councils gives us the right to assume that the whole commune stands behind the declaration. We shall, however, return to this problem in connection with hypothesis generation.

Regardless of the majority group's composition, however, it seems reasonable to suppose that, as a whole, it behaves as a collective and therefore may be regarded as an individual decision-maker in a functional sense.

2. The classic picture of "economic man" or "administrative man" has been that complete knowledge of the alternative courses of action has been required. Modern theory has significantly modified this picture. (Katona 1953, Simon 1947). For example, Simon has introduced the concepts of limited bounded rationality and "satisficing", which implies that the decision-maker is content with specifying a few of all the alternative courses of action which are theoretically possible. In experimental studies the alternative courses of action are virtually always given.

The local council sessions have to take a standpoint on a given proposal, namely the County Administrative Boards' suggestions for bloc plans. At least two courses of action are possible, namely to approve the suggestion or to reject it. Where it is rejected there might be an opportunity of submitting alternative suggestions. We shall return to these opportunities in section 5.

3. The commonly used terms for the decision-maker's chances of predicting the outcome and consequences of alternative courses of action are "states of nature" or "future states of affairs". In the light of this the following situational categories are used as substitutes for a continuum.

a) Decision under certainty
b) Decision under risk
c) Decision under uncertainty (Knight 1923)

a) Decision under certainty means that the decision-maker definitely knows that a certain outcome always follows upon a certain course of action.

b) Decision under risk means that the decision-maker is aware of all the alternative courses of action. Of these at least one leads to at least two mutually exclusive events. The decision-maker is, however, aware of the exact probability of these.

c) Decision under uncertainty is characterized by all the courses of action and all the outcomes being known. The uncertainty concerns the probabilities of the outcomes occurring.

Game theory situations can often be regarded as combinations of risk and uncertainty. The outcomes and consequences are here dependent upon the decisions of a rational opponent. To the extent that his aims and values are known, the uncertainty can be reduced.

In what follows we shall account for a number of consequences which may be presumed to result from the particular proposal which the councils have to take a stand on. We shall also try to make an estimate of the probabilities of these occurring *providing the proposal goes into effect,* that is, *providing the Government legalizes the bloc-formations proposed.*

3.a. *The commune's future status in the bloc plan.* In section 2 we have observed that a significant motive for the reform has been an attempt to achieve general stability in population and economic terms for the local units. Another motive has been to create a rational distribution of public service such as, for example, within the school sector. The setting up of the bloc plan should therefore take place with the aim of choosing as central communes places suitable for a junior high school. Since national agencies have a great influence over the localization of schools and even over the localization of public services, the qualification for being a central commune or an independent bloc must be regarded as entailing a greater *growth in service* than the qualification for being a fringe commune. We can also assume that the public services will be localized at a close distance. In other words the status quality influences the variable *proximity to services.*

3.b. *The number of representatives.* According to the Swedish local government laws at the time of the reform the local council could only to a certain extent influence the *number* of council members.[4] It was stated that communes of a size of less than 2,000 inhabitants could appoint between 15 and 30 councillors, communes with 2,000–5,000 inhabitants 20–35 councillors and so on. This provision meant that in the smallest communes about 15 $^0/_{00}$ of the inhabitants could receive a post in the council, in communes over 20,000 inhabitants only about $2^0/_{00}$. The Swedish local political system also demands that councillors are appointed on the whole proportional to the population total within the constituency. These requirements could make it possible for a local council to predict the number of representatives who could reckon on representing the commune in a presumptive future bloc simply through knowledge of the commune's share of population in the bloc suggested.

3.c. *Party political composition.* A boundary reform where, to all intents and purposes, the functional region principle is applied, must involve radical consequences for the parties' relative strengths at the local level, since the Swedish

political system is to a large degree built up around the social and economic population structure. (Särlvik 1969). In this way the Swedish parties have gained their local anchorage in somewhat different types of communes.

Table III. The relative strength of the five Swedish parties among all voters, among three categories of "bloc-status" and among all communes. Mean percentages except for all voters. 1962 local elections. (Var. A7-A11, Appendix)

Political party / Bloc-status	N	Conservative Party (A7)	Centre Party (A8)	People's Party (A9)	Social Democrats (A10)	Communists (A11)
All voters		15.5%	13.1%	17.1%	50.5%	3.8%
Independents	34	9.4%	13.1%	14.1%	56.8%	7.1%
Central communes	268	14.4%	13.3%	16.5%	52.9%	3.1%
Peripheral communes	582	12.7%	28.2%	13.1%	44.0%	2.3%
All communes	966	13.2%	23.8%	14.0%	46.7%	2.6%

Table III shows that relatively substantial differences exist between the three status categories as regards the proportion of Centre Party voters and the proportion of Social Democrats, and the following Table shows that a substantial negative change for the Centre Party can be predicted for peripheral communes. Consequently, the same party will make substantial gains in the central communes to the extent that the local election results of 1962 are repeated. An unchanged level has in this Table been set at 50 (cf. Appendix var. B 10). As far as the Social Democrat changes are concerned, there are positive gains in the peripheral communes, while negative effects occur in the central communes. Other parties are only moderately affected.

With what probability can one forecast the election result from one election to

Table IV. Predicted average political changes for the five Swedish parties among all communes, among peripheral and central communes. (Var. B7-B11, Appendix). SD = Standard deviation

Bloc-status / Party	All communes		Peripheral communes		Uni-polar central communes	
	Mean	SD	Mean	SD	Mean	SD
Conservative Party (B7)	50.35	3.88	50.92	4.40	49.15	2.81
Centre Party (B8)	46.90	11.37	41.80	10.69	56.45	7.45
People's Party (B9)	50.64	4.42	51.75	4.96	40.47	2.97
Social Democrats (B 10)	51.85	9.75	54.98	10.38	46.15	6.32
Communists (B 11)	50.23	2.38	50.47	2.86	49.87	1.43
Numbers	966		582		268	

another? This is clearly a difficult problem to decide upon. First, one can measure the correlation between two elections. We have done this and found that the concordance between the 1960 Lower House election and the 1962 local elections is r = .987, and between the local elections of 1958 and 1962 r = .950. Deviations of more than two percentiles are relatively uncommon. These calculations have been made for only a small number of communes and also only in respect of the combined proportion of voters for the Social Democrat Party and the Communists. Secondly, one can quite simply argue that even if it is not possible to make a complete prediction from one election to another, it is the only way our local politicians can have proceeded if they have at all considered the political dimension as relevant to their decision-making. For this study, therefore, the assumption is made that the party political consequences can be forecast with complete certainty.

4. A normative decision theory presupposes that the decision-maker is "infinitely sensitive" and rational. The concept of rationality includes an assumed utility function. If x and y are two alternatives, the rational individual, whose utility function is u, prefers x to y if, and only if, u(x) is greater than u(y) (Adams 1960). From this assumption the assumption of *transitivity* is derived: "If x is preferred to y, and y to z, then x must be preferred to z". Another consequence is the assumption of *consistency*. "If x is preferred to y, then y cannot at the same time be preferred to x."

Empirical research has demonstrated that when making choices people do not by any means always conform to demands of *transitivity* or *consistency*. Papandreo's experiments (1953) are an example of a successful testing of the transitivity axiom. The large number of negative results has, however, led to a modification of the theory along the lines of the development of a probability theory of utility. Among other things attempts have been made to establish the utility functions as a function of inconsistent behaviour, working on the assumption that the closer two objects are as regards utility, the greater the difficulty in deciding preferences. (Mosteller & Nogee 1951). Others have also included measurements of time consumed in choosing from among different objects. (Coombs & Beardsley 1954).

Modern theory often defines utility as the decision-maker's satisfaction with achieving his goals. Consequently, the concept of utility is less meaningful to the degree that the decision-maker has no objectives. Descriptive theoreticians have not gone so far as to ascribe to the decision-makers a lack of goals, though at times one notes the conception that decision-makers do not have clearly specified objectives. In Simon's "Behavioural Model" (Simon 1955) clear goals and cardinal utility are assumed. Wilson & Alexis (1962) assume "predetermined" or "ideal" goals for their "open" decision model. On the other hand they object to the classic idea that a decision-maker maximizes his goals. In the above instances, maximization is left out, primarily because of a lack of information or insufficient time to gather full information. The decision-maker therefore satisfies.

Since, in the situation being analysed, decision-making takes place under exceptionally favourable conditions as regards available information and time at

disposal, it seems reasonable to assume that rationality is high. We assume that the decision-makers are able to carry out a consistent evaluation of, among other things, the above-mentoned consequences in light of their local political goals. Given that such an evaluation means that a proposal cannot be accepted, we can assume that the decision-makers try to arrive at an alternative which more fully satisfies their objectives. Furthermore, it does not seem unreasonable to believe that the decision-makers are so well informed about communes in the neighbourhood that the optimal bloc-formation could be determined. We do not presuppose, however, that the decision-makers always choose such an optimum alternative.

5. In the general decision-making situation there are two preference systems. The one concerns outcomes and consequences and the other one should exist in the alternative courses of action. The decision-making problem can be stated in the following way:

"Provided that the preferences in outcomes and consequences are given, which course of action is to be chosen?"

The solution cannot be indicated unambiguously in a normative theory, for it is dependent on the nature of the decision-making situation as regards "states of nature".

But when deciding under complete certainty the problem is simple: the decision-maker maximizes the utility. When deciding under risk the classic solution is that the pattern of preferences for the courses of action ought to be determined from an estimate of the expected value of the outcomes, i.e. the product of the value of an outcome and the probability of such an outcome coming about.

After having discovered the "Petersburg Paradox" Bernoulli suggested that decision-makers ought to maximize expected utility. (Bernoulli 1738). In modern times it has been suggested that maximization ought to mean subjective expected utility (Ramsey 1931, Edwards 1954) since decision-makers seldom know the objective probabilities.

In decision-making situations of uncertainty, the problem is even more complicated. The norm is far from unambiguous. If the uncertainty is total and the "opponent" can be considered to be "nature" we have, among other things, Wald's maximin criterion which can be viewed as a pessimistic criterion. An optimistic one, given the same situation, is Hurwicz's maximax. A third one is Laplace's criterion of insufficient reason which states that the decision-maker should give the outcomes the same probabilities.

If the uncertainty depends on a rational opponent's decision and the situation is marked by keen competition and conflict the norm prescribes the minimax loss's criterion, which is basic to the game theory. (Luce & Raiffa, op. cit.).

6. Summary

Our survey of the decision-situation so far can be summarized in the following points:

1. We are dealing with a group decision with the group acting as an individual decision-maker in the functional sense. The composition of the group can, however, vary. Under certain circumstances the group constitutes the majority constellation, i.e. the bourgeois or socialist majority. Under other circumstances either the commune is unanimous or the majority has another composition. What we found out as regards this must be of great importance in generating hypotheses concerning party-political consequences.[5]

2. At least two alternative courses of action exist, namely a) adopting a bloc proposal or b) rejecting it. Alternative proposals can be presented.

3. The consequences mentioned can in each instance be predicted with total certainty provided the County Administrative Board's bloc alternative goes into effect.

4. It is, however, not certain that the county proposals will be adopted by the government without changes. This means that the consequences *cannot* be predicted with absolute certainty. Since the basic principles have been decided upon, amendments ought, however, to be predictable with *limited certainty,* and considering our assumption under point 3 the predictability of the consequences coming about is identical with the probability of success for an amendment.

5. With reference to information and time aspects and the otherwise basic political significance of the question, it is reasonable to assume that the stands taken by the decision-makers are marked by a high degree of rationality. To test statistically whether the consequences discussed and considerations of probability have influenced the decision-makers seems, therefore, reasonable.

5. The Opportunities for Putting Forward Amendments. Theory Formation

In the case of a remitment situation a seemingly reasonable and rational approach is to reject a proposal only in connection with proposing an alternative. We have found that save for a few instances this pattern has been followed. This has led us to query what probabilities exist for introducing an alternative bloc proposal. Such alternative proposals can be of the following types:

1. The commune wishes to achieve the status of independent status.
2. The commune wishes to achieve the status of central commune.
3. The commune wishes to transfer to another bloc and another central commune.
4. The commune wishes to change the composition of the bloc in some other way.

Before we start discussing each of these alternative suggestions separately we note three things. First, *the precision of the principles for reform* is not such that the choice of central communes and fringe communes and the choice of a particular

bloc size are given. As regards bloc size only a minimum size is indicated and, besides, certain exceptions are allowed. Secondly, *the principles are not always compatible.* Bloc size demands may under certain circumstances be in conflict with the principle of a functional region, which means that room should be given for priority discussions. Thirdly, *the County Administrative Boards' application* of the reform principles – it can be assumed that the decision-makers at least have information about the decisions taken by the County Administrative Board in their own county – indicates that the 8,000 limit has not been attained on frequent occasions, or that areas with a relatively low index of centrality have been accepted as central communes.

With reference to these three factors it ought not to be considered unreasonable to propose amendments. Such an amendment may, however, be more or less reasonable as regards the principles depending on the commune's characteristics. *Our theory holds that the decision-makers only introduce amendments through which local political objectives can be achieved if there exists a reasonable chance of success.*

This theory can be justified as follows. Introducing a proposal which compared with another proposal has less possibility of success can clearly be said to be less in accordance with the principles, and it might therefore be assumed that it will be considered "irrational" by those who subscribe to the goals and values of the principles, especially since the principles have been decided upon by a majority in Parliament.

Thus we have here relationships which are presumably conflict-charged and the risk of conflict can be defined in terms of probability of success.

$$\text{If } P_s = p, \text{ then } P_k = 1 - p^6,$$

where P_s = probability of success,
and P_k = probability of conflict without the compensation inherent in success. P_k can also be seen as the "distance" between the decision and the principles.

It is assumed that a conflict can arise between the decision-maker and the one, or those, who share the values of the principles. The opposition can consist of three groups. First, the government, second, those communes which may be affected by the decision, and finally, those groups within the commune who prefer other solutions.

A conflict situation cannot only be defined in terms of conflicting interests but should also contain an element of the probability of sanctions from the opponents. What sanctions can conceivably be brought to bear against the decision-makers by the three opponent categories? In this respect the conflict situation is somewhat vague. Sanctions from the government can hardly mean more than a slight deterioration in relations in the sense of being regarded as "irrational". In relation to neighbouring communes the sanctions can consist of lobbying and expressing pessimism to the government as regards the chances of the alternative functioning as a future commune. Another sanction could be greater competition and difficulty

in promoting the interests of the commune in bloc co-operation. In relation to the groups within the commune, one can foresee a keener struggle to gain votes and thus such a deterioration in relations between the parties that large coalitions centred around broad solutions within local politics will be impossible to achieve. Since commune amalgamations are voluntary, communes will function as separate units for some years to come. Co-operation within a commune is therefore not unimportant, nor is co-operation within the planned bloc.

Thus it is clear that a hypothetical conflict does not involve drastic sanctions and that we are not dealing with a zero-sum situation.[7] Nevertheless one should be able to view the situation as a potential conflict situation and it seems reasonable to derive the probabilities of avoiding a conflict from the probabilities of success.

Thus we can characterize the decision-making we have dealt with as a *risk-taking situation,* wherein the input also consists of goodwill with various bodies.

We can now have a look at some decision-making models which have been developed for risk-taking situations. The first which should be mentioned is the SEU-model, which states that the decision-maker seeks to maximize

$$SEU = \sum_i P_i U_i$$

where SEU = subjective expected utility, P_i = subjective probability with regard to outcome i, and U_i = utility. The model, which can be considered as a descriptive modification of the classic model for "economic man" in the risk situation, namely maximization of expected value (EV), has been tested in several experimental contexts with varying results. (Edwards 1955). It appears to give better prediction in the case of group decisions than with individual decisions. The same condition seems to apply even for the EV-model (Marquis & Reitz 1969). Group discussions influence the decision-making in the direction of greater risk-taking with positive expected value and less risk-taking when the expected value is negative, which means that the decision-makers seem to adapt their behaviour more exactly to probabilities.

An explanation for the SEU-model not working with individual decision-making may depend on the difficulty in experiment situations of avoiding a connection between utility and the probabilities. Kurt Lewin (1944), Atkinson (1957), and Feather (1959) demonstrate models where the dependence between these factors appears as theoretically essential. Atkinson goes furthest in this respect by assuming that "incentive value", i.e. the utility factor, can directly be derived from the probabilities of success according to the following:

$$\text{if } P_s = p, \text{ then } I_s = 1 - p, \text{ and } I_f = -p$$

where I_s = the value of succeeding, and I_f = the cost of failing. As may be seen the latter is negative. The assumption implies that the utility of succeeding at a high level of aspiration is appreciably greater than that of succeeding at a low level. If a similar assumption seems reasonable in an individual psychological

context it can hardly be reasonable in connection with group decisions where most often the personal competence element disappears.

In our situation it seems less reasonable to assume a connection between utility and probability of the nature mentioned. It also seems less reasonable to assume that the probabilities of success or failure might have any other implication for the decision-making than as a general factor through which the conflicts can be estimated. A failure with one alternative merely means a loss of very small inputs of work and time, if we disregard the risks of conflict.

As a summary of this section the following theory can be submitted. With a simple modification of the SEU-model our theory is that the decision-makers maximize:

$$SP_i = U_i \times PS_{si} + {}^{-}UC_i \times PC_{si},$$

where SP_i = strategy potential of strategy i, U_i = utility of strategy i with respect to local objectives, PS_{si} = the probability of success with strategy i, ${}^{-}UC_i$ = the negative disutility of a conflict, PC_{si} = the probability of conflict, and where $PC_{si} = 1 - PS_{si}$.

It may clarify matters somewhat to make some references to the decision-making models mentioned above. Thus: "strategy potential" corresponds to the concept of "weighted valence" in the aspiration model presented by K. Lewin et al. as well as to the concept of "resultant motivation" employed by Atkinson, the SEU-concept in the model suggested by W. Edwards, and the "choice potential" in N.T. Feather's model. It is also seen that PS_{si} and PC_i bear resemblance to "expectancy" (Atkinson), and "probability" (Lewin et al., Edwards, Feather), just as U_i and UC_i correspond to "utility" (Edwards), "incentive value" (Atkinson), "valence" (Lewin et al.), and "attainment attractiveness" (Feather), in these related theoretical models.

It should, however, be observed that the element of conflict in this model will not be tested empirically. The relation between the risks of conflict and the probabilities of success can only be justified on reasoning. Hereafter we shall employ a terminology which is more closely allied to current usage of language, by making the most of the term "probabilities of success". Similarly only the first utility factor will be dealt with.

6. Hypothesis Generation

Since from now on we shall be dealing with peripheral communes only we shall begin looking at the probabilities of success with the four strategy alternatives mentioned. These can be derived from the following matrix, which gives the principle demands that should be placed on a municipal bloc or a central commune.

Demands:	*Strategies:*			
	S_1	S_2	S_3	S_4
Size 8,000 inhabitants	×			
Balanced population trend	×	×		
Administrative centre with sufficient service functions (index of centrality)	×	×		
Functionally demarcated bloc (commuter contacts)	×	×	×	×

As can be seen there are substantial differences in respect of the demands for the four strategy alternatives. If we go back to Tables I and II we can see how these variables predict the County Administrative Boards' choices of status categories. With bloc sizes under 8,000 inhabitants the balance in population trend is important. The index of centrality variable is important in selecting central communes and to some extent independents. There are, however, substantial differences between these two status categories, because the probability of being independent rises to a certain point but then drops off. This difference arises, of course, because status as an independent commune can only be achieved when the functional region is practically identical with the administrative unit, and this occurs when the area's index of centrality does not reach all too high values.[8] In consideration of these conditions it should, therefore, be reasonable to suppose that the commune characteristics which are primarily in respect of these variables comprise the decision-makers' basis for a sort of merit evaluation of the commune, and a summarizing index of the commune's relative merits may be regarded as decisive for the decision-makers' subjective estimate of the probabilities of success with a certain strategy.

Since the merit evaluation or the subjective probability of success with S_1 or S_2 varies in respect of more than one variable the question arises as to whether the decision-makers' estimate includes an appraisal of the probabilities as being independent of each other. If such is the case a purely multiplicative model for the probabilities is achieved. The assumption that the probabilities are considered to increase both additively and multiplicatively would seem to be somewhat more reasonable, however, which means that the following model for the probability factor may be assumed:

$$PS_{si} = a + b_1P_1 + b_2P_2 + b_3P_3 + b_4P_1P_2 + b_5P_1P_3 + b_6P_2P_3 + b_7P_1P_2P_3 + e,$$

where PS_{si} = the total subjective probability of success with strategy i, and (P_1, P_2, P_3) = "merits" with respect to the principles 1, 2 and 3. So much for the probability factor.

The utility factor U_i is assumed to be linked to the consequences analysed in section 4. Three consequences will be considered here, namely *growth in services* (4.3.a), *proximity to services* (4.3.a) and *party political changes* (4.3.c). As concerns the first two we have assumed that status itself in the bloc plan is fundamental. Both the status categories *stand independent* and *become a central commune* give more favourable consequences in comparison with qualification as a

peripheral commune. To achieve status as independent or as central commune may therefore be regarded as independent goals apart from being used to avoid or achieve other consequences and objectives.

These hypotheses will be tested by investigating to what extent councils of different status reject the County Administrative Board's proposal. In Table V the three status categories have been divided into negative, acquiescent, and wholly positive councils.

Table V. The relationship between bloc-status and satisfaction. Percentages
"Negative communes" comprise communes which have either chosen S1-S4 or have explicitly stated that they will not merge voluntarily. "Acquiescents" comprise communes, which have merely accepted the bloc-formation. "Positive communes" comprise councils which have explicitly stated that they are satisfied with the formation of the bloc proposed by County Administrative Board

Bloc-status \ Satisfaction	Positive communes	Acquiescents	Negative communes	Number	%
Independents	29	65	6	34	100
Central communes	14	76	10	268	100
Peripheral communes	7	53	40	582	100

We find here that the satisfaction is clearly greater among the first two status categories. The same picture is obtained if we look at the rejecting councils' attempts to change their status categories. None in the first category and three in the second put forward proposals for becoming fringe communes while about 90 in the third category want to be either central communes or independent. This appears to give overwhelming support for status categories one and two having a higher utility value than status category three.

The third utility component we shall consider concerns displacements in the balance of political power. As has already been pointed out in section 4.1, the cases of conflict which have arisen in this question have not simply followed the bourgeois-socialist blocs. Except for purely regional conflicts in a third of the cases the conflicts have a clear bloc quality. In 84 % of the councils there have been no conflicts at all. The question now is whether we can draw the conclusion from this that there has been unity in these cases. We know from earlier surveys within the Local Government Research Project that open conflicts are extremely rare in Swedish local politics. This is first and foremost the case with all serious questions. So far we have less knowledge of latent conflicts. According to the preliminary result of a questionnaire, however, there appear to be not insignificant differences in the question of political valuations between the party groups.[9] These differences appear to increase with rising urbanization and size. Among communes with less than 8,000 inhabitants there are only small value differences as regards different levels of population density, though a tendency to increase can be seen moving

from rural communes to more urbanized ones. Those value differences which exist within small communes (peripheral communes in our study) appear on the whole to exist only between the socialist and non-socialist council blocs.

These circumstances, plus the fact that the cases of conflict analysed in our survey indicate bloc conflicts to a certain extent, mean that we should be able to make the assumption that political changes between the blocs have played a part in the forming of attitudes. If we presuppose that the non-socialist or socialist majority is primarily responsible for the council's decisions we can imagine two variables which measure the relative changes between the blocs. First, we use a variable which gives two different conditions, namely, the bloc majority retains or loses its majority position in a hypothetical amalgamation (var. B13). Since the rule of proportionality applies in the Swedish local government system in connection with the appointment of the local council or "government", political influence over local policy may be assumed to be to some extent proportional to the relative number of councillors and voters. Therefore we have constructed the other variable so that it only measures the bloc majority's procentual positive and negative change, without consideration of whether there would be a change in majority (var. B14). Thirdly, however, it cannot be excluded that complete unity may have prevailed within the council in several cases. If, in spite of this, relative power changes have been of importance in forming an opinion, a variable consisting of a summation of the relative changes without regard to signs, should prove to have effect (var. B15). Thus these three variables comprise alternative measures of the party-political changes.

In section 4.3.b we have considered the loss of position as representative of a negative consequence of the reform. Our assumption is that this consequence could be rather well predicted by a variable, which is simply the percentage of inhabitants of the bloc-formation (var. B3). However, in the context of an analysis of choice of S1 or S2 this variable is strongly intercorrelated with variables expressing "merit-rating" or "probabilities of success." Therefore conclusions built upon the explaining effect of this variable seem to become rather meaningless. Nevertheless it will be included in some analyses.[10]

Considering our assumption that status as a central commune or as independent constitute independent goals, our theory predicts the following:

1. Population trend, index of centrality, and to some extent size should vary positively with the choice of either S1 or S2.
2. There should be statistical interaction between these variables.
3. At a certain level of probability of success with S1 or S2 the choice of S1 or S2 should be more frequent among those communes where the proposal implies party-political changes, and this difference in frequency should be greater the higher the levels of probability of success are. Thus there should be statistical interaction between the "utility" components and the "probability" components.
4. When the choice is *between* S1 and S2 the index of centrality should vary positively with choice of S2 and size positively with choice of S1.

7. Presentation of Results. Choice of S_1 or S_2

In an analysis of a theoretical model within the social sciences, great attention must be paid to statistical interaction.[11] The foregoing theory demands this to a greater extent than usual. In the normal analysis situation, where interaction only occurs between a couple of variables, the problem is most often solved with the aid of a variable combination, after which the usual additive multiple regression techniques can be applied. In more sophisticated contexts, too, a model constructing is accomplished where the causal context is cut out. (Blalock 1962). Since the interplay between the variables in our model has been assumed to take place according to a simultaneous rational calculation in the decision-makers' minds, and since we have predicted a rather complex pattern of interactions, we shall neither give attention to causal modelling in this sense nor try to combine the interacting variables in order to get rid of the problem. The theoretical importance of the interactions makes it more reasonable – apart from the fact that such a combining process might have been impossible – to direct our analyses primarily towards proving that interactions actually exist.

Since our dependent variable is a "dummy variable" with the values zero and one, the table showing relative frequencies or percentages is the normal method of analysis, and the interaction should be investigated by examining "differences between differences in proportions", (Blalock 1969). If, however, there exists intercorrelation between the observed variables, it may be difficult with this technique alone to prove that the differences as regards proportions are not an artefact of the intercorrelation. Two independent variables which appear to interact by giving rise to percentage differences can intercorrelate with a third or fourth independent variable and the percentage differences measured might therefore depend on additive complements of intercorrelated variables. It seems reasonable, therefore, to regard the dependent variable as an interval scale, which makes it possible to use current variance and regression methods of analysis. Such methods, however, should not exclude the use of percentage differences as a measure.

The multivariate analysis to be presented first has been carried out with the help of the AID-programme (Automatic Interaction Detector), which has been developed primarily for the testing of statistical interaction.[12] At the same time as the hypothetically interesting variables, a number of other variables, 14 in all, have been used. All of these have been tested under the same conditions within the framework of the automatics of the AID-programme.[13]

As shown by *Figure 1,* which presents the result with choice of S_1 or S_2 as dependent variable, index of centrality ratio has been used as first predictor. Then follows, in both branches, population trend. In two of the following subgroups, variables which are correct in terms of hypotheses have come into use (index of centrality and size), while in the third group another variable, index of self-employment, has appeared. A non-conservative would, however, regard even this variable as a reasonable carrier of probabilities of success.

So far as the interactions are concerned the shape of the tree has a bearing.

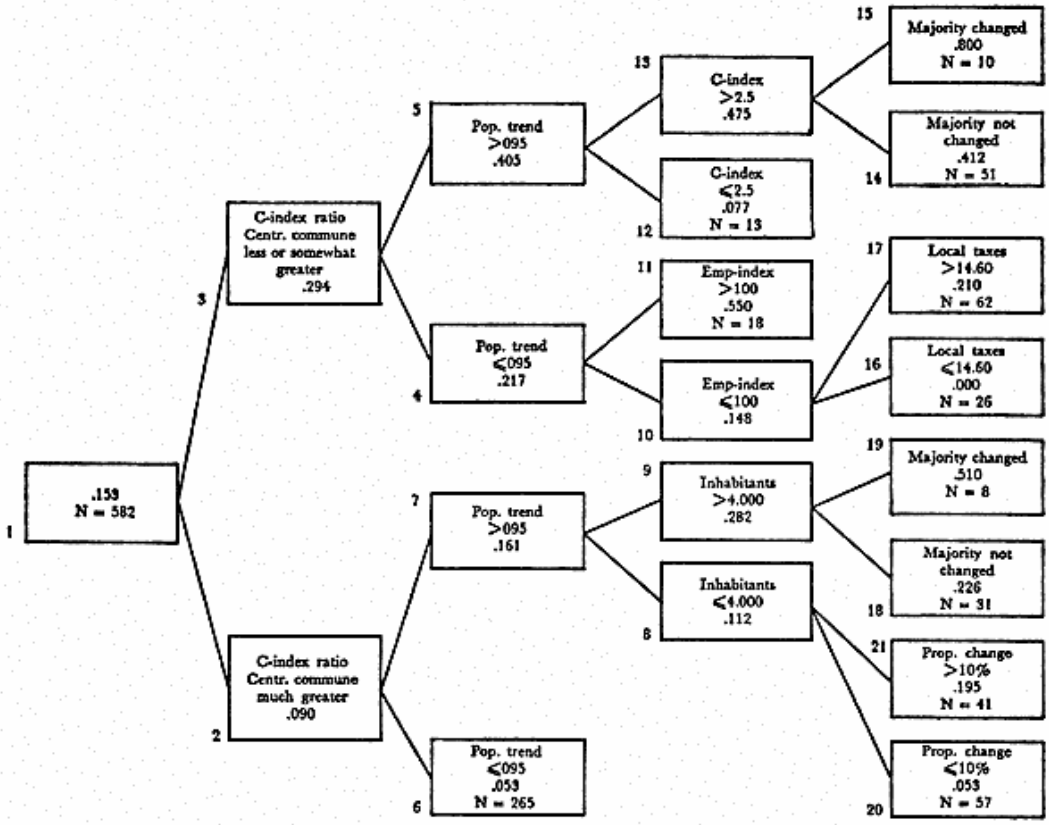

Fig. 1. Choice of S_1 or S_2 (status as independent or as central commune) among peripheral communes.

Sonqvist et al. have pointed out that an asymmetric pattern is most often due to interactions. There is only little evidence of this in our Figure except for group 6, which comprises a large number of communes and also a substantial amount of residuals of variance. In this group our predictors simply do not work. (cf. op. cit. under note 12; see also Morgan 1964).

Another way of noticing interactions is to make comparisons between subgroups in terms of their mean values. The first three splits seem to reveal an additive pattern as regards the shape, since population trend has been introduced on both the second and third occasions. Comparing the differences in mean values between groups 7 and 6 on the one hand and groups 5 and 4 on the other, however, we obtain a difference between differences amounting to roughly 10 percentiles. This obviously supports the idea that population trend and C-index ratio interact.

A third way of examination of the AID-results is to make comparisons between variables by means of the correlation ratios, given in Table VI. In the very first group, comprising the total number of peripheral communes, two variables reach almost the same level as regards the correlation ratios. These are C-index ratio and C-index. When the programme selects the first of them, decomposing the group into groups two and three, we can observe that the explaining capability of the variable has been nearly exhausted, which is quite natural. The same thing has

Table VI. Automatic Interaction Detector running choice of strategy 1 or strategy 2. (Achieve status as independent or as central commune). The Table shows BSSi/TSSi or the correlation ratios within each subgroup

Variables \ Subgroup in Figure 1	1	3	5	13	4	10	2	7	9	8
B 15. Sum pol. change	(.032)	(.031)	(.054)	(.057)	(.020)	(.010)	(.008)	.008	.013	.007
B 14. Prop. change	(.007)	.017	.045	.043	(.006)	.011	(.004)	.025	.024	**.060**
B 13. Maj. change	.001	.026	.073	**.083**	.002	.009	.002	.027	**.061**[1]	.031
B 5. Adm. distance	.007	.011	.000	(.010)	.029	.070	.000	.001	–	.020
A 1. Inhabitants	.035	.039	.057	.031	.007	.005	.022	**.044**	(.006)	(.002)
B 1. Inhab. ratio	.007	.003	.000	.007	.004	.009	.008	(.024)	(**.136**)	.043
B 2. C-index ratio	**.069**	.012	.046	.058	(.003)	.000	.007	.017	.008	.012
A 4. C-index	.063	.011	**.095**	.001	(.016)	(.003)	.013	.021	.024	.003
A 3. Local taxes	.025	.041	.032	.068	.104	**.073**	.010	.024	–	.022
A 5. Pop. dens.	.032	.025	.008	.004	.007	.000	.014	.002	(.005)	.003
A 2. Population trend	.038	**.042**	(.002)	(.005)	.000	(.003)	**.032**	.008	(.001)	.012
A 6. Emp.-index	.034	.037	(.002)	(.006)	**.138**	.015	.006	.010	.001	.014
B 3. Perc. inhab.	.008	.013	.004	.005	(.008)	.006	(.004)	(.003)	(.068)	(.007)
B 4. Perc. commuters	.019	.018	(.010)	(.007)	.069	(.020)	(.002)	.003	(.002)	.014
BSSi/TSSt	.069	.021	.023	.017	.027	.011	.014	.011	.006	.006
N =	582	180	74	61	106	88	402	137	39	98

Key to the signs: bold = used for split
( ) negative association according to hypothesis

[1] Shown in Figure 1 because of its theoretical importance.

obviously happened to the second variable mentioned, which could be given the interpretation that a substantial intercorrelation exists between them. However, in the case of rising correlation ratios what conclusion could be drawn? Evidently it cannot be due to intercorrelation between the variables so far introduced. Instead you can give it a cautious interpretation in terms of interaction, cautious because there might be intercorrelations due to variables not introduced. As can be seen such a pattern is not rare in the Table.

One example of this will be pointed out. Of the three political variables two have come into use in the AID-test, namely majority change and proportional bloc-change. If we examine Table VI with respect to the measures of correlation ratio for the variable majority change, we find that from group 1, through group 3 to group 5 these coefficients assume higher and higher values. This seems to give a rough indication that this variable interacts with C-index ratio and population trend. The same is the case with the inhabitant variable, as is seen on comparison of groups 2, 7 and 9. As regards the AID-analysis, our hypotheses 1 - 3 seem thus to be confirmed on the whole, even though we must point out that the decision-makers' merit estimation or probability judgements have been linked to more factors than those we have predicted.

We shall, however, not satisfy ourselves with this analysis, but continue with a presentation of these associations in the form of a set of tables, partly because of a risk of intercorrelations and partly because the correlation ratios will not be completely reliable for a comparison of the type we have carried out.[14]

Table VII clearly shows that interaction exists between most of the variables

Table VII. Relative frequencies or proportions of choices of S1 or S2 (achieve status as independent or as central commune) in different types of communes defined by C-index ratio (B2), inhabitants (A1), pop. trend (A2) and majority change (B13). The dichotomizations have been made according to the AID – results shown in Figure 1

		No majority change		Differences in proportion	Majority change		Differences in proportion
		Pop. trend ⩽095	Pop. trend >095		Pop. trend ⩽095	Pop. trend >095	
C-index ratio high	Inhabitants >4,000	.2857 N = 21	.5000 N = 26	.214	.2500 N = 4	.1000 N = 3	.750
	Inhabitants >4,000	.1857 N = 70	.2286 N = 35	.043	.2727 N = 11	.6000 N = 10	.327
		.1000	.2714	.171	–.0227	.4000	.423
		Pop. trend ⩽095	Pop. trend >095		Pop. trend ⩽095	Pop. trend >095	
C-index ratio low	Inhabitants >4,000	.0909 N = 33	.2258 N = 31	.135	.0000 N = 8	.5000 N = 8	.500
	Inhabitants <4,000	.0537 N = 149	.0746 N = 67	.021	.0400 N = 75	.1935 N = 31	.154
		.0372	.1512	.114	–.0400	.3065	.346

which have been included in the analysis. Difference between differences in proportions assumes higher and higher values from the fourfold table lowest down to the left to the table furthest up to the right, indicating that not only first-order interactions are present.

As mentioned, the interaction picture we obtain from the tabulation can to a significant extent be the additive effect of the input variables *and* one or more variables which are not present. The way we have chosen to control this consists of multivariate analyses with the aid of the analysis programme Multiple Classification Analysis.[15]

This programme carries out multivariate analyses only within the framework of an additive model. This technique is most often used in the analysis situation when one knows that interaction does not exist and when one intends to test the "effect" of one or more independent variables, while considering the intercorrelation. The programme has recently been used by B. Särlvik (1970) for a similar purpose – testing the relation between religious behaviour and voting, "controlling for socio-economic background."

In our case the programme will be used for the purpose of establishing how great the additive and total effect, adjusted for intercorrelation, is of the most important variables used in the AID-analysis. This total additive effect can then be compared with the total result of AID. The difference between these total "effects" should give the total interaction present in our data.

The multivariate MCA-analysis we have carried out with all the variables used in the AID-runs except for B3 and B15 has resulted in a multiple R = .384, which means that R^2 or the proportion of explained variance amounts to .147.[16] In the AID-analysis these figures amount to R = .461 and R^2 = .212. The difference .071, comprises 33.3 % of the proportion of explained variation which AID can produce. It should be added that the variables have been used dichotomized in the MCA-analysis. The dichotomization has occurred in the form made or intended by AID, in other words in the way the AID-programme has been found to be most effective.

The MCA-programme has also another quality which can be used for our purpose to demonstrate interaction. Among other things coefficients are presented which give deviances from overall mean for each subgroup defined by the variable values for the independent variables. The coefficients are presented both unadjusted and adjusted. The latter show the effect after consideration has been taken of the intercorrelation. By adding the latter coefficient values for a number of subgroups, the additive adjusted effect can be obtained. The difference between observed value and the value predicted in this way by MCA consists of the interaction effects. In Table VIII the result has been compiled.[17]

The Table should be read in the following way. On the first line the overall mean of the dependent variable is given, i.e. the proportion choice of S_1 or S_2 (Cf. group 1 in Figure 1). Line two gives the "effects" of the variable C-index ratio. In column one, unadjusted coefficient shows that low value for this variable "lowers" the mean .063 units. If notice is taken of the intercorrelation with other

Table VIII. Multivariate analysis (MCA) of choice of S_1 (status as independent) or S_2 (status as central commune) among peripheral communes. Additive model
The first nine predictors have been ranked according to the "beta-coefficients" of the MCA-analysis. Since Andrews et al. have emphasized that these coefficients should not be interpreted in terms of variance explained, we have not given the actual figures. Among the predictors there are two (4. Maj. change and 12. Prop. change) which should not be regarded as "probability predictors", but as measures of differences in utility. For these the upper label of the first three columns should read "no change" and the label of the last three columns "change"

Predictors		Prob. of success low			Prob. of success high		
		Unadjusted coefficient	Adjusted coefficient	Successively added "effect"	Unadjusted coefficient	Adjusted coefficient	Successively added "effect"
Overall mean			.1529			.1529	
1. C-index ratio	(B 2)	—.0634	—.0370	.1159	.1415	.0827	.2356
2. Inhabitants	(A 1)	—.0369	—.0271	.0888	.1232	.0905	.3261
3. Pop. trend	(A 2)	—.0532	—.0368	.0520	.0935	.0647	.3908
4. Maj. change	(B 13)	—.0071	—.0252	.0268	.0204	.0726	.4634
5. C-index	(A 4)	—.0607	—.0240	.0028	.1344	.0532	.5166
6. Emp-index	(A 6)	—.0358	—.0187	—.0159	.1152	.0602	.5768
7. Perc. comm.	(B 4)	—.0274	—.0120	—.0279	.0897	.0394	.6162
8. Local taxes	(A 3)	—.0139	—.0019	—.0298	.0456	.0063	.6225
9. Adm. dist.	(B 5)	—.0091	—.0006	—.0304	.0317	.0019	.6244
10. Inhab. ratio	(B 1)	—.0260	+.0147	—.0157	.0133	—.0075	.6169
11. Pop. dens.	(A 5)	—.0564	+.0028	—.0129	.0560	—.0027	.6142
12. Prop. change	(B 14)	+.0189	+.0112	—.0017	—.0296	—.0175	.5967

variables (adjusted coefficient, col. 2) the "lowering" is reduced to .033 units, which results in the value .120 (= successively added "effect") Correspondingly, high variable values for C-index ratio give an increase in the mean of .142 (unadj. coeff.) and .073 (adj. coeff.) units respectively. Successively added effect then becomes .153 + .073 = .226. The line for the 9th independent variable, Adm. distance, now shows in columns three and six that the additive effect of nine independent variables gives us a difference between highest and lowest value of roughly .65 units. This can be compared with the difference in the mean value in Table VIII, which amounts to .95 to 1.00 units depending on which cell one starts from. The comparison can, of course, also be made with the differences between, for example, groups 6 and 15 in Figure 1. In both these comparisons an appreciable distance is left between predicted and observed value, and since the predicted values have been obtained with the help of nine, or more correctly, twelve independent variables as against four with the observed values, there can be no doubt that interaction exists. At the same time it should be observed that there exists a fairly widespread intercorrelation between the variables, which comes to light in the differences between unadjusted and adjusted coefficients (Table VIII). Thus the interaction picture we have observed in Table VII with the help of differences between differences in proportions depends to a certain extent on intercorrelation.

Despite a certain risk that the four variables in Table VIII are intercorrelated with other variables we shall proceed with trying to distribute the interaction among various variable combinations. This we have tried to do by using a stricter variance analytical programme called ANOVA.[18] The ANOVA-analysis we have carried out, to exactly the pattern which Table VIII demonstrates, can, expressed simply, give us a picture of how much of the variance in the dependent variable is explained, partly by each of the four variables separately (main effects), partly by combinations of two, three or four of them (interaction effects). The total "main effects", i.e. the sum of the four separate variable effects, can be said to comprise the total additive effect and this is therefore comparable to unadjusted multiple R or R^2 in an MCA-analysis for the corresponding variables.

According to the ANOVA-output the main effects amounted to 12.7 %. First order interactions (pair combinations only) gave an increase of 3.3 %. Second (combination of three) and third (combination of four) order interactions gave altogether 0.5 %. Thus in all 16.5 % is explained. The interaction effects together comprise about 25 % of the variance explained.

A factorial variance analysis has also been carried out with the variable index of centrality ratio replaced by the variable index of centrality, while the variables population trend, size and majority change have been retained. The result of this analysis is presented in Table IX. Since all the variables have been dichotomized the values of mean squares have been left out. They are identical to the sum of squares. The observation we can make from the Table is that practically every interaction term gives an observable increase in the proportion of explained variance and in the case of the variable majority change this produces something which is virtually only in combination with other variables. In this analysis the interaction effects together account for pretty well exactly a third of the variance explained, which corresponds well to the difference between the AID and MCA analyses referred to above.

We must point out, however, that the proportion of variance explained in all the analyses presented remains at a relatively low level. This seems to some extent to result from the number of observations in those cells or sub-groups which assume the highest mean values being relatively few. This also causes the interaction effects to be, relatively speaking, fairly small in terms of explained variance, while in terms of percentage differences they are distinctly dominant. An analysis of the type Galtung (1967, p. 413 and subseq.) suggests would give quite another picture. Mean values calculated from a small number of observations are on the other hand extremely dubious, even if there are advocates for such a strategy in situations like this, where a complete population is comprised.

All the analyses presented have consistently shown that interaction exists between the predictors and this interaction appears to exist both between the probability components themselves and between the probability and utility components. This is wholly in line with what the model and our theory predict.

We shall further try to illustrate the multiplicative element between utility and probabilities. To check whether the variable majority change, which has proved

Table IX. Multifactorial analysis of variance of choice of S1 or S2 (achieve status as independent or as central commune). The dichotomizations have been made according to the AID-results, shown in Figure 1

Effect	Df.	Sum of Squares	F-ratio	%
C-index (B 4)	1	3.94	35.58	
Population trend (A 2)	1	1.60	14.40	
Inhabitants (A 1)	1	2.78	25.05	
Majority change (B 13)	1	0.08	0.75	
Main effects Σ BSS		8.40		11.1
C-index × Pop. trend	1	.88	7.93	
C-index × Inhabitants	1	.90	8.11	
C-index × Maj. change	1	.45	4.08	
Pop. trend × Inhabitants	1	.59	5.34	
Pop. trend × Maj. change	1	.31	2.77	
Inhabitants × Maj. change	1	.03	0.30	
1st order interactions Σ SS		3.16		4.2
C-index × Pop. trend × Inhabitants	1	.00	0.00	
C-index × Inhabitants × Maj. change	1	.54	4.89	
C-index × Pop. trend × Maj. change	1	.02	0.14	
Pop. trend × Inhabitants × Maj. change	1	.14	1.30	
2nd order interactions Σ SS		.70		0.9
C-index × Pop. trend × Inhabitants × Maj. change				
3rd order interactions Σ SS	1	.39	3.49	0.5
Sum of BSSq ("Explained")		12.65		16.7
Sum of WSSq (Errors)	566	62.74		83.3
Total sum of squares		75.39		100.0

to be the utility variable that functions best, intercorrelates with other variables, a significance test has been carried out in the following way. We have reasoned that both the commune groups defined by the variable majority change can be regarded as two "experiment groups" whose strategy-potentials for S_1 or S_2 are built up in the following way as regards the utility factor:

SP_m for the group with majority change $= U_{\bar{p}c} + U_{a,c} + U_{\bar{M}p} + U_e$,

$SP_{\bar{m}}$ for the group without majority change $= U_{\bar{p}c} + U_{a,c} + U_e$,

where $U_{\bar{p}c}$ = the utility of avoiding qualification as a fringe commune, $U_{a,c}$ = the utility of achieving status as independent or central commune, $U_{\bar{M}c}$ = the utility of avoiding majority change in combination with qualification as a fringe commune, and U_e = the utility of other consequences.

If we can make the assumption that $U_{\bar{p}c}$, $U_{a,c}$ and U_e are identical between both groups, the only difference between the groups in respect of utility will be the utility linked to the avoidance of majority change. If we, in addition, can assume

that the groups have the same prospects as regards probabilities of success, we should be able to carry out useful separate analyses of the two groups.

The test we have carried out was thus intended to establish significant differences between the groups regarded as random samples from the same population of fringe communes. The test has resulted in all the consequence variables, except the political ones, showing *completely random* differences.[19] As concerns the probability variables, most of the variables have shown that clearly significant differences exist. These differences, however, prove to have a regular pattern in such a way that it is always the group *with* majority change which has the lowest mean values. Thus the group with *the strongest incitement to choose S_1 or S_2 has, throughout, the lowest probabilities of success.* This result makes comparisons of separate analyses quite reasonable.

In the following Table we have put together the main results of our separate analyses. It may be mentioned that the MCA-result is based on a multivariate analysis of index of centrality ratio, population trend, inhabitants, index of centrality and index of self-employment. Of 13 independent variables AID has, in the group without majority change, used in 16 splits, the variables C-index ratio, emp.-index, population trend, inhabitants, C-index, and pop. pol. change. In the other group AID has made use of only three variables, namely population trend, index of centrality, and C-index ratio. Five splits have taken place in this one.

Table X. Multiple correlation coefficients of MCA and AID, analysing choice of S1 or S2 (Achieve status as independent or as central commune) in two subgroups defined as regards change in political majority

Model and Method of Analysis	Majority not changed		Majority changed	
	R	R^2	R	R^2
Multiple Classification Analysis (MCA) (Additive model)	.383	.147	.526	.277
Automatic Interaction Detector (AID) (Without any assumption of additivity)	.448	.201	.631	.399

The Table (X) demonstrates two things. First it is clear that an additive model is not the most suitable in any of the experiment groups. Interaction is still present and exists more or less exclusively between probability variables. Secondly, it is equally clear that substantial differences exist between groups where it has been a question of exploiting the probabilities of success. In other words, the result lies mostly in line with our theory and our hypotheses. It may also be mentioned that the two AID-analyses presented *together* explain over 27 % of the variance, which gives a multiple R of .52.

8. Presentation of Results II. Choice Between S_1 and S_2

Altogether 89 communes have chosen one of the strategies 1 and 2. The choice between these strategies will be very briefly presented in what follows. In section 6 we predicted that choice of strategy 2, to achieve status as central commune, should vary positively with index of centrality, while choice of strategy 1 should vary positively with size. Since population trend has been assumed to predict both choice of S_1 and S_2, this should not have any great effect on the choice between these. The test we shall present consists only of an AID-analysis. The result is to be found in *Figure 2*. The same collection has been used as independent variables as is to be found in Table VI. The dependent variable has been given the value 0 for choice of S_1 and the value 1 for choice of S_2.

The pattern in Figure 2 supports our hypotheses. It is interesting to find that in cell 8, where equally reasonable probabilities of success appear to exist for both strategies, the relative frequencies are also equally great.

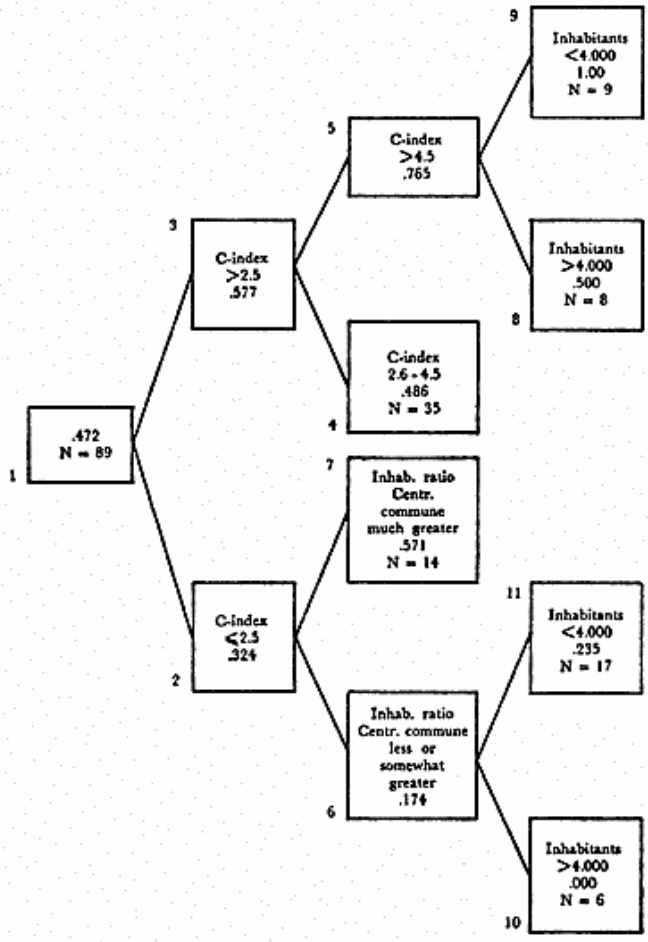

Fig. 2. Choice of strategy 2 (status as central commune) among peripheral communes choosing S_1 or S_2.

The observed relative frequency in this group can also be taken as a starting point for a discussion concerning the relatively moderate power of explanation our model appears to have. At best we have managed to explain 27 %, which was the combined effect of the two AID-analyses presented in Table X. In one of the two specified separate groups, however, the AID gave a multiple R^2 of .399, which might be regarded as relatively high. Otherwise the analyses have resulted in very moderate effects.

The low values can be partly explained by a skewness in the dependent variable. Another and more satisfactory explanation may be that the ecological variables used constitute only rough measures of "merits" and "probabilities" of success. Not even the choices of status categories of the County Administrative Boards (Tables I and II) "are explained" more than partly by the variables used. This depends, of course, on the functional region not allowing itself to be operationalized so easily, since the space situation for a commune is always unique. General, perfect measures can quite simply not be created.

One can look somewhat lightly upon the model's "poor power of explanation" for yet another reason. In group 8 there remains an appreciable residual variance, since the mean value is .50 and the dependent variable can only assume the value 0 or 1. Despite this residual we have obtained a mean value which is the one we really want from a theoretical point of view. The qualification combinations give the decision-makers a "free" choice between S_1 and S_2, and the predicted value should actually be as it is. Since neither we nor the decision-makers can make other than subjective assumptions about an ordinally underlying continuum of probabilities or merits, we should quite simply hope that our observed mean values correspond to a similar continuum, and with such a state of affairs a full explanation becomes meaningless, if not to say impossible, since all variance is explained around the mean value zero or one.

9. Summary

The analyses performed seem to have given substantial support to our hypotheses. We have found that certain ecological variables, such as size, population trend and C-index, can predict the decision-makers' choice of strategy to some extent. We have also found that variables such as C-index ratio and index of employment have a predicting capability of roughly the same size. This seems to mean, or could at least be given the interpretation, that the merit-calculus of the decision-makers has included more variables than was originally assumed. The "merit-predictors" also seem to be to some extent exchangeable.

Secondly, an additive model does not seem to fit the data because of a great deal of interaction between several variables of those mentioned above. This too is a nice result from our theoretical point of view, even if there are some deviances from a perfect interactive pattern.

Thirdly, at least one variable, assumed to give a measurement of differences between two categories of communes with respect to the utility of the achievement of a change in status in the bloc-plan, has shown up a relationship consistent to our theory. By employing a control for the level of "probabilities" we have observed that the decision-makers seem to choose S_1 or S_2 more often when there is an expected majority change than in a situation where a majority shift is not expected. Furthermore the differences in relative frequency of choice of S_1 or S_2 under these two conditions are not constant, comparing two levels of probabilities of success, but seem to increase when we move from a low level to a higher one. These findings obviously support the theory that there is a multiplicative relationship between utility and probability.

It can be argued, however, that the assumption of constant utility in achieving status as a central commune or as independent or of avoiding political power shifts, will not hold good. It can, for example, be contended that utility rises with rising probabilities of success. This seems to be not unreasonable in the sense that the greater the economic resources and the more developed the local public services are, the less the need is felt of a reform and the greater importance the political balance of power has for the allocation of resources. If this is true there must fundamentally be an extremely high consensus around both the reform and its principles among the Swedish local politicians. The march of events during the sixties as regards the accomplishment of the reform does not seem to confirm this contention. And besides, it can just as reasonably be contended that the greater the resources and the more developed the services, the less will be the disadvantages of being a peripheral commune. But even if it were so that the utility to some extent varies with the probabilities, it would appear to be very difficult to explain our findings, especially in Figure 2, without including a probability factor in the model.

In conclusion, therefore, we would like to point out that our basic theory, which states that the decision-markers' attempt to adapt their local political ambitions to the probabilities of success, has received support. That this behaviour has prevailed we have assumed to depend on two efforts from the decision-makers, namely to maximize or optimize their political goals, and to attempt to avoid conflict. Considerations of probability or conflict should therefore be seen as an expression of the decision-makers' moderation of their claims and choice of a level of aspiration more in line with their prospects.

An important element in this study has been to demonstrate the possibilities of meaningfully carrying out a decision study on the basis of treatment of official material only. This attempt has made it necessary to base the analysis on a series of presuppositions and assumptions which in their turn have been based on a description of the decision situation. These elements in the study had necessarily to be made with great simplifications of reality, not merely as regards presentation but also as to facts.

The relatively moderate power of explanation in terms of variance explained, which the model has proved to possess, should therefore be partly judged from the point of view that the study constitutes an experiment in method after all.

APPENDIX. *Synopsis of variable constructions and references*

A. Structural variables

A 1. Number of inhabitants (Inhab.). 7 classes, normal distribution.

A 2. Population trend (Pop. trend). 1955 - 1962. Percent index (1955 = 100). 7 classes, normal distribution.

A 3. Local taxes (Loc. tax) according to local decisions 1961. 6 classes, normal distribution.

A 4. Index of centrality (C-index).

Formula: C-index = $\sqrt{Bt \,.\, mt - Pt \,.\, kr}$, where Bt = number of retail shops in the built-up area, mt = constant for the size of retail shops in different parts of the country, Pt = number of inhabitants in the built-up area, kr = constant for the average service – supply in different parts of the country. The variable has 7 classes and is highly skewed. (cf. note 2.)

A 5. Population density (Pop. dens.). Percentage of inhabitants living in urban areas of the commune. 8 classes, normal distribution.

A 6. Index of self-employment (Emp-index).

Formula: Emp-index $= \frac{EP \div Co + Ci}{Ep}$, where EP = number of economically active inhabitants, Co = commuters out of the commune, and Ci = commuters into the commune. The variable has 7 classes, normal distribution.

A 7. Percent voters for the Conservative Party in 1962 local elections.

A 8. Percent voters for the Centre Party in 1962 local elections.

A 9. Percent voters for the People's Party in 1962 local elections.

A 10. Percent voters for the Social Democrats in 1962 local elections.

A 11. Percent voters for the Communists in 1962 local elections.

A 12. Percent voters for the Social Democrats and Communists together. (A10 + A11.)

B. Situational or contextual variables

B 1. Inhabitant ratio (Inhab. ratio).

Formula: Inhab. ratio $= \frac{\text{Inhab c}}{\text{Inhab p}} \,.\, 100$, where Inhab c = number of inhabitants in the central commune and Inhab p = number of inhabitants in the peripheral commune. The variable is transformed and is normal distributed. 7 classes.

B 2. Index of centrality ratio (C-index ratio). The same construction as B1 but as regards C-index. The variable has been transformed but is still skewed as A4. 6 classes.

B 3. Percentage of inhabitants of the total bloc (Perc. inhab.). 10 classes, somewhat skewed.

B 4. Percentage of commuters towards the central commune (Perc. comm.) This variable gives a measure of the relative size of commuting in the direction towards the central commune. The variable has 5 classes and is normally distributed.

B 5. Administrative distance (Adm. dist.). This variable tells the order in which the peripheral communes are situated around the central commune. The value of two for instance gives the information that there is another peripheral commune situated between the commune and its central commune. The variable has 3 classes and is skewed distributed.

B 7. - B 12. Predicted political changes (Pol. change).

Formula: Pol. change = 50 + (PVib — PVip), where PVib = percentage of voters of the i:th party in the bloc-formation proposed, PVip = percentage of voters of the i:th party in the peripheral commune. These variables correspond to variables A7 - A12. 9 classes and normal distribution.

B 13. Majority change (Maj. change). Dichotomy. 1 = when the majority bloc, i.e. the socialist or the bourgeois, is predicted to lose its majority position. Zero otherwise.

B 14. Proportional majority change (Prop. change). This variable is built upon B12 but increasing values always indicate negative predicted political changes for the bourgeois or the socialist majority bloc. 5 classes and normal distribution.

B 15. Sum of predicted political changes (Sum pol. change). This variable is built upon a summation of the deviances around 50 in variables B7 - B11. 7 classes and normal distribution.

NOTES

[1] A closer presentation of the theories of functional regions would lead us too far. References can be made to Hagget, P: *Locational Analysis in Human Geography,* London, 1965, p. 114 and subseq., and p. 241 and subseq. See also Godlund, S: *Busstrafikens framväxt och function i de urbana influensfälten,* Lund, 1954. With a summary in English.

[2] The index of centrality, developed by Prof. S. Gound, University of Gothenburg (cf. n. 1), has the advantage of being easily obtained, using official sources. It is applied as a quantitative measure of the magnitude in influence a built-up area exercises over its surroundings. Knowing the indices of two different urban areas and the distance between them the functional boundary can be quite easily determined theoretically. If this operation is repeated in all relevant directions the whole so-called hinterland can be explored. This method as well as empirical ones have been employed by the County Administrative Boards. The exact formula is given in the appendix.

[3] Our information about these matters has been obtained by the use of an enquete-questionnaire. A local officer in those communes having a division was asked for a distribution of those councillors participating in the decision with respect to their party membership and home district.

[4] The Local Government Act of 18th Dec. 1953, § 5. After 1970 the local council autonomously decides its size.

[5] Only in this context does the problem of "ecological fallacy" seem to have relevance for our analysis. Cf. Robinson, W. S. "Ecological Correlations and Behavior of Individuals", *American Sociological Review,* XV, June 1950, pp. 351-357.

[6] It can be argued that there is no reason why subjective probabilities should sum up to unit. As a matter of fact we do not postulate this being the case, nor do we have in mind a perfect linear relationship. Our precise statement should be regarded as a rather rough one.

[7] A zero-sum situation in the game theoretical sense is characterized by pure, keen competition, where the players are supposed to fight and defeat each other. What one player gains the other loses. At least in the "power relation" between national and local levels no such zero-sum situation exists. In the context of service-allocations a zero-sum situation between regions and communes could very well be the consequence of a strong manifestation in the situation being studied.

[8] Since Swedish towns and cities have not been submitted to any boundary changes except for some minor adjustments, and since the 1952 reform as regards rural communes was not based on the functional principles, there are great discrepancies between the administrative and functional regions all over the country. Only communes of intermediate sizes, comprising rural as well as urban areas, are able to show a concordance in this respect.

[9] Strömberg, Lars. Unpublished results of the enquete-investigation *Väljare och valda* (The Electors and the Elected). Swedish Local Government Research Project C.

[10] At a later stage of this investigation it might be possible to show the importance of this variable with more accuracy. According to the basic hypothesis put forward by Anthony Downs in his *Economic Theory of Democracy* the ultimate striving in politics is the striving for power positions. So far as Swedish politics is concerned it could very well be different. Cf. Molin, Björn: *Tjänstepensionsfrågan,* Akademiförlaget, 1965, pp. 140-142.

[11] A discussion of the crucial concept of statistical interaction would lead us too far. In short we can give an operational definition: Under interaction the relationship between an independent variable and the dependent one will be different for different values of a second or third independent variable. A good introduction can be found in Galtung (1967) p. 415 and subseq. See also the literature referred to under notes 12 and 15. Theoretical discussions can be found in Coleman, J: *Introduction to Mathematical Sociology,* Free Press of Glencoe, 1964, p. 220 and subseq., and Blalock, H. M.: *Theory Construction,* Prentice-Hall, 1969, Appendix A.

[12] For an introduction see Sonqvist, J. A. & Morgan, J. N.: *The Detection of Interaction Effects.* Institute for Social Research, Ann Arbor, Michigan, 1965. This programme as well as the others used in our analyses has been available through IUCPR and ISR. The version of the programme library is called Osiris I.

[13] In all AID-analyses referred to, the "split reducibility criterion" has been put at the recommended level of .006, which means that no split can be made unless six tenths of one

percent of the original variation in the dependent variable can be explained by the intended maximum split. Only monotonic splits have been permitted.

[14] Despite its label AID can by no means be said to reveal interactions "automatically". The programme output should always be examined in detail. The correlation ratios can give some help to identify different types of relationships as regard the same variables in different branches of the tree, but it should be noted that this measure can only be a substitute for the b-coefficients, which are the relevant parameters which should be compared in order to catch sight of interactions. Unfortunately the programme does not give the b-coefficients, but a rather satisfactory substitute is a comparison of mean values between sub-groups, which have been obtained by splits of the same predictor. Correlation ratios are never completely substitutable to the difference between differences in proportions, running a dummy dependent variable, since the variation (= TSS) is dependent on group sizes as well on the mean. The relationships in terms of mean-values should therefore be plotted habitually.

[15] A presentation of the MCA-program can be found in Andrews F; Morgan J; Sonquist J: *Multiple Classification Analysis,* Institute for Social Research, Ann Arbor, Michigan 1969.

[16] The multiple correlation coefficients of the MCA-analyses are not the so-called adjusted multiple coefficients, which have been "adjusted" with respect to degrees of freedom. The coefficients we have given have been obtained by recalculations of the adjusted ones in order to make possible an adequate comparison with the AID-results.

[17] The adjusted coefficients (not to be mixed up with the multiple ones mentioned under n. 16) are comparable to the b-coefficients of a multiple regression with dummy variables. Like these the coefficients can be written in an equation, but for our purposes a table is more suitable.

[18] The programme version we have used is a variant of the MANOVA-programme in Osiris I (PH 740). The version is called ANOVA, and it is referred to in the text as a factorial analysis of variance. However, it should be mentioned that the version has the capability of taking care of intercorrelations between the "factors" used (non-orthogonal factors).

[19] Here we primarily have in mind a couple of variables which have not been introduced in this presentation. As an example may be mentioned a discrete variable expressing the difference in local taxes between the peripheral commune and the central one.

REFERENCES

Adams, E. W.: Survey of Bernoullian Utility Theory, in Solomon, H. (ed.) *Mathematical Thinking in the Measurement of Behavior.* Free Press of Glencoe, 1960.

Atkinson, J. W.: Motivational Determinants of Risk-Taking Behavior. *Psychological Review,* vol. 64, 1957.

Bernoulli, D.: Specimen Theoriae Novae de Mesura Sortis. *Commentarii Academia Scientiarium Imperialis Petropolitanae* 5, 175–192 (1738).

Bernoulli, D.: Exposition of a New Theory on The Measurement of Risk. *Econometrica,* vol. 22, 1954.

Blalock, H. M.: *Causal Inferences in Non-Experimental Research.* Univ. of North Carolina Press, 1964.

Blalock, H. M.: *Theory Construction.* Prentice-Hall, Englewood Cliffs, N. J., 1969.

Brantgärde, Lennart: Verkställigheten av kommunalblocksreformen – en studie i politisk beslutsfattande i en "risk-taking" situation. *Kommunalforskningsgruppens avhandlingsserie nr. 20,* 1970 (Stencil).

Bross, Irwin D. J.: *Design for Decision.* 1953. In Swedish 1966. Aldus A183.

Coombs, C. and Beardsley, D. C.: Decision-Making under Uncertainty, in Thrall, Coombs et al. (eds.) *Decision Processes.* Wiley & Sons, New York, 1954.

Edwards, Ward.: The Theory of Decision-Making. *Psychol. Bulletin,* vol. 51, no. 4, 1954.

Edwards, Ward.: The Prediction of Decisions among Bets., *Journal of Exp. Psych.,* vol. 66, 1955.

Feather, N. T.: Subjective Probability and Decision under Uncertainty. *Psychol. Review.* vol. 50, 1964.

Galtung, Johan: *Theory and Methods of Social Research.* Universitetsforlaget, Oslo, 1967.

Golembiewski, R. T.: Small Groups and Large Organizations. in March, J. (ed.). *Hand-*

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REFERENCES

Adams, E. W.: Survey of Bernoullian Utility Theory, in Solomon, H. (ed.) *Mathematical Thinking in the Measurement of Behavior.* Free Press of Glencoe, 1960.

Atkinson, J. W.: Motivational Determinants of Risk-Taking Behavior. *Psychological Review,* vol. 64, 1957.

Bernoulli, D.: Specimen Theoriae Novae de Mesura Sortis. *Commentarii Academia Scientiarium Imperialis Petropolitanae* 5, 175–192 (1738).

Bernoulli, D.: Exposition of a New Theory on The Measurement of Risk. *Econometrica,* vol. 22, 1954.

Blalock, H. M.: *Causal Inferences in Non-Experimental Research.* Univ. of North Carolina Press, 1964.

Blalock, H. M.: *Theory Construction.* Prentice-Hall, Englewood Cliffs, N. J., 1969.

Brantgärde, Lennart: Verkställigheten av kommunalblocksreformen – en studie i politisk beslutsfattande i en "risk-taking" situation. *Kommunalforskningsgruppens avhandlingsserie nr. 20,* 1970 (Stencil).

Bross, Irwin D. J.: *Design for Decision.* 1953. In Swedish 1966. Aldus A183.

Coombs, C. and Beardsley, D. C.: Decision-Making under Uncertainty, in Thrall, Coombs et al. (eds.) *Decision Processes.* Wiley & Sons, New York, 1954.

Edwards, Ward.: The Theory of Decision-Making. *Psychol. Bulletin,* vol. 51, no. 4, 1954.

Edwards, Ward.: The Prediction of Decisions among Bets., *Journal of Exp. Psych.,* vol. 66, 1955.

Feather, N. T.: Subjective Probability and Decision under Uncertainty. *Psychol. Review.* vol. 50, 1964.

Galtung, Johan: *Theory and Methods of Social Research.* Universitetsforlaget, Oslo, 1967.

Golembiewski, R. T.: Small Groups and Large Organizations. in March, J. (ed.). *Hand-*

book of Organizations. McNally & Company, New York, 1965.

Katona, George: Rational Behavior and Economic Behavior. *Psychol. Review,* vol. 60, no. 5, 1953. Also in Gore & Dyson. (eds.). *The Making of Decisions.* Free Press of Glencoe, 1964.

Knight, F. H.: *Risk, Uncertainty and Profits.* Houghton Mifflin, Boston, 1921.

Lewin, K., Dembo, Tamara, Festinger, L. & Sears, P.: Level of Aspiration. J. Mc. V. Hunt (ed.). *Personality and the Behavior Disorders.* Ronald Press, New York, 1944.

Luce, Duncan, R. & Raiffa, Howard: *Games and Decisions.* Wiley & Sons, New York, 1957.

Marquis, Donald, G. & Reitz, Joseph H.: Effect of Uncertainty on Risk-Taking in Individual and Group Decisions. *Behavioral Science,* vol. 14, no. 4, 1969.

Morgan, James N.: The Achievement Motive and Economic Behavior. *Econ. Devel. and Cultural Change,* vol. 12, 1964.

Mosteller, F. & Nogee, P.: An Experimental Measurement of Utility. *Journal of Pol. Ec.* vol. 59, 1951.

Papandreo, A. G.: A Test of Stochastic Theory of Choice. *Univer. Calif. Publ. Ec.* 1957.

Ramsey, F. P.: *The Foundations of Mathematics and Other Logical Essays.* Chapt. 7. Truth and Probability. Harcourt Brace, New York, 1931.

Simon, Herbert A.: *Administrative Behavior.* 1947. 2nd. ed. Free Press of Glencoe, 1957.

Simon, Herbert A.: A Behavioral Model of Rational Choice. *Quarterly Journal of Ec.* 1955. Reprinted in *Models of Man.* Wiley & Sons, New York, 1956, and in Gore & Dyson (eds.). *The Making of Decisions.* Free Press of Glencoe, 1964.

Särlvik, Bo: Socioeconomic Determinants of Voting Behavior in the Swedish Electorate. *Comparative Politics.* vol. 2, no. 1, 1969.

Särlvik, Bo: Socioeconomic Position, Religious Behavior, and Voting in the Swedish Electorate. *Quality and Quantity IV,* no. 1, pp. 95–116, 1970.

Westerståhl, Jörgen: Swedish Local Government Research. *Scandinavian Pol. Studies,* vol. 2, 1967, pp. 276–280.

Westerståhl, Jörgen: Ett Forskningsprogram. *Kommunalforskningsgruppens skriftserie,* vol. 1, Almqvist & Wiksell, Uppsala, 1970.

Wilson, Charles & Alexis, Marcus: Basic Frameworks for Decisions. *Journ. of the Academy of Management,* vol. 5, 1962. Reprinted in Gore & Dyson (eds.). *The Making of Decisions.* Free Press of Glencoe, 1964.