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Measuring development: An application to two rural Iowa communities

by

Jonathan Gerald Strauss

A Dissertation Submitted to the
Graduate Faculty in Partial Fulfillment of
The Requirements for the Degree of
DOCTOR OF PHILOSPHY

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Approved

Signature was redacted for privacy.
Members of the committee

Signature was redacted for privacy.
In Charge of Major Work

Signature was redacted for privacy.
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Signature was redacted for privacy.
For the Graduate College

Iowa State University
Ames, Iowa

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Albert Einstein claimed to have had but two original thoughts in his entire life. I would be satisfied with one, this thesis. But alas, I must confess a measure of debt to too many people to be able to claim this as my first original contribution.

Each member of my committee assisted in various ways, always ready to answer the many questions which occurred to me in the course of writing this study. My thanks go to Professors Eldridge, Lapan, Paulsen, and Rodgers. In addition to providing this type of assistance, I would like to make a special note of appreciation to the other two members of my committee. To Professor D. Kaldor, whose persistence and tenacity in forcing me to realize the many errors I was about to commit helped me see the study through to the end. To Professor K. Fox, whose work in expanding the scope of economics in which tradition this study hopefully follows.

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Finally, I would like to dedicate this dissertation to my parents, who have waited thirty years to see it completed.

PREFACE

The work reported in this thesis was done during the academic years 1972/73, 1973/74, 1974/75, with the quantitative work being done in the spring and summer of 1975.

The purpose of this study was to complement other work being conducted in the area of rural development, particularly at Iowa State University, such work having different emphases or objectives than those of the present study.

The problem which this study can hopefully contribute towards solving is that without an acceptable procedure for evaluating rural development projects, practitioners and advisors are often unable to satisfactorily resolve questions of resource allocation either within a community or between communities.[1] An example of the latter problem might arise in the case of a limited amount of public funds - either state or federal - being made available to assist small communities attract new business activities. Given the limitations on such funds, some rule for deciding priorities is needed. Profitability or rate of return criteria will generally be too limited in scope to answer such questions. Qualifying both these rules by the use of the word "social"

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[1] See Maddox (1973, p. 4).

in turn raises many further questions, some of which this study deals with.

The contribution which this study makes to the problem is to develop a procedure which assists in evaluating policies for increasing economic activity in small Iowa towns. This is done by demonstrating one way in which community goals, both economic and non-economic, can be obtained from a chosen community.

The acceptability of the procedure developed here rests on certain assumptions which may not be agreed upon by other persons working in the field, in particular assumptions as to the nature of social choice. But for those workers who do accept the reasoning used, this procedure may hopefully be of some use.

CHAPTER 1.

THE PROBLEM OF RURAL COMMUNITY DEVELOPMENT

Introduction

All countries, rich or poor, exhibit varying degrees of concern for both the regional distribution as well as the total level of economic activity. Such concern may be found in official statements of concern and--though often lagging behind the former--in public policy and legislation. That such interest is general rather than specific to certain countries has led to certain writers, such as Schumacher, to say:

> "The all prevailing disease of the modern world is the imbalance between city and countryside, an imbalance in terms of wealth, power, culture, attraction and hope. The former has become over-extended and the latter has atrophied." (Schumacher, 1973, p. 191-2)

Although the concern may be general, the specific causes and problems giving rise to such concern may vary according to certain circumstances. One such distinction is between those countries undergoing an agricultural revolution and the process of urbanization for the first time, and those countries in which structural changes are the product of a much earlier revolution. The U.S., as an example of the latter situation, experienced a rise in its rural population up until 1934. As new agricultural technologies have been introduced the farm sector has provided a steady flow of migrants to the country's urban centers, partially due to the

higher birth rate of the rural areas. (Weaver, 1971). In addition, the process of structural adaptation and change as low income marginal farmers leave the industry is frequently a painfully slow process requiring more than a generation to be accomplished (Robinson, 1969).

In contrast to this type of situation in which the differential birth rate coincided fortuitously with the increased need for urban labor, in many countries in the former category there exists today a situation in which urbanization is the result of population pressure in the rural areas before the demand for urban labor has risen (Weaver, 1971). In certain cases this problem has been intensified by the introduction of new labor-displacing agricultural techniques. A further contrast is to be found in the fact that in the case of those countries in the former category, the decline in the agricultural population was more than offset by an increase in per capita food production. In several countries in the latter category this has not been the case.

Given these distinctions, one would expect differences in the nature of the problem being experienced and the policies being pursued. In the former countries the rural problems of prime concern are, as mentioned below, the product of an unequal distribution of the benefits and costs of agricultural development, in particular the costs borne by

rural service towns. Policies to combat this problem include, amongst others, attempts to relocate industry away from metropolitan areas. In the latter group of countries concern with rural problems is focussed on the agricultural sector itself, on the need to provide employment and not merely provide an alternate location for it, as well as the need to develop rural villages.

Evidence of such concern, as well as an acknowledgment of failures of previous thinking and policy, began to appear by the mid-1960's (e.g. Lipton and Streeten, 1968). Nineteen hundred and seventy-five may be noted as the year in which the reformation was completed, with the publication of a policy statement to the effect that:

> "...too strong an emphasis on the modern sector is apt to neglect the growth potential of the rural areas. Failure to recognize this has been a major reason why rural growth has been slow and rural poverty has been increasing" (World Bank, 1975, p. 16).

Rural Community Development -- The Problems of Measurement

Whereas the above interest in rural community development is more frequently concerned with the problems of initiating and achieving development, this study is specifically concerned with the problems encountered in measuring the results of such a process. Much of the criticism which can be levied against development practitioners is due to their failure to explain what is being measured, and how. More often than not, out of a sense

of frustration, and a desire to show that something is being done, the process of doing becomes a substitute for the achievement of goals. And administrators, for this reason, fear the consequences of conducting policy analysis and evaluation of such programs. Hence the economists cry of "maximize" becomes replaced by the social welfare administrators cry of "do something", and "do something good" (Banfield, 1970).

Measurement. In order to perform any type of measurement, the following three elements have to be known in advance:

(a) goals have to be specified,

(b) the means whereby the above goals can be realized have to be understood as a separate issue from either (a) or (c)

(c) the means whereby it is known that the goals in (a) have been realized. This is the purpose for which rules of measurement are designed.

Such measurement has two fundamental purposes related to (a) and (b), which also have to be carefully distinguished.

(a) a procedure or rule for comparing state S(0) with a later state S(1). Various rules of differing complexity and power exist for such purposes.

(b) a means whereby S(1) can be compared with some other (usually unknown) situation S(1)* which, it is argued, would have existed in the absence of the policies developed to bring about S(1).

Although these two purposes are conceptually separate, in most situations both will be required, if only because most analysis involves a study of the impact of economic policies. However, the purpose of this study is limited to (a), and is concerned with developing a technique for measuring S(0) and S(1).

Problems Encountered. The study will deal with several problems which arise both in the problem of measurement generally and in the specific context of measuring rural community development. The two fundamental problems which have to be solved are;

(a) defining the scale to be used for measuring a state, for example S(0) and S(1)

(b) the problem of obtaining weights to be used in valuing S(0) and S(1). In this study this problem is further complicated by the need to obtain

(bi) individual weights,

(bii) community or group weights.

Alternate Approaches. The problem of defining a scale of measurement can be approached directly or indirectly. In the former approach one attempts to measure the phenomenon or state itself. In the latter approach one looks for surrogate or substitute phenomena which, by virtue of their close association with the less tangible phenomena, and of their ease of measurement, provide an indirect solution to the

problem.

The problem of weighting or valuation is a separate problem for which several alternate solutions exist.

(a) price based weights. These can be either market or non-market (shadow) prices. National income and product accounts are the most familiar examples of the use of such weights.

(b) non-price systems. In these, weights are obtained directly by examining the preference function itself. Several alternative methods which have been developed for this purpose are

.i. investigation of past decisions to derive implicit weights.

.ii. (related to .i.) analysis of "log-rolling" or vote trading.

.iii. simulation or experimental generation of preference functions.

Empirical Testing. Each of these alternatives poses its own set of demands and problems when being tested empirically. These will be discussed below, together with a third procedure, developed for this study, which is offered as an alternative approach and which is discussed in detail below. The essence of this proposal is to obtain expenditure, not preference patterns, in which price and quantity information is combined.

Defining Three Key Words: Rural, Community, Development

This study is concerned with the problem of measuring rural community development. However, one's ability to measure a phenomenon or process depends on the precision of the definitions employed. That much confusion and disagreement exists in the social sciences is due in no small part to the lack of precision and constancy in the definitions used. It is to this purpose that considerable attention is paid to defining the words rural, community, and development.

Each one of the last three words, rural, community, and development needs to be defined for two reasons. Firstly, because of lack of precision surrounding the usage of the word and the resulting confusion this can cause. Secondly, each word is a key, but only in so far as each word complements the other two to provide an integrated statement of definition, purpose and of the problem to be studied. In addition to need, such definitions also serve a second role, that of providing an introduction to the problem being considered, the approach being followed and the problems to be encountered. As a result, the following remarks should be read bearing in mind that subsequent portions of the study will be dealing in greater length with some of the issues raised here.

In attempting to define these words it has been necessary to bear two considerations in mind: The customary usage(s) and the intended usage in this study. Where no clear definition through customary usage exists, the one most suitable for the present study has been chosen. However, rather than be too much at variance with customary usage, thereby generating further confusion, precedent has been allowed to dominate in such cases.

Unlike the situation in certain sciences where measurement, definition and taxonomy are fundamental to all work, within the social sciences there is no such common language. Thus, disagreement over the definition of terminology is rarely the result of a conscious confrontation, but more frequently the product differences of discipline, time, place, of culture and of custom. Where the latter of the above two considerations is given precedent it is because of such differences in the present study.

Development will be defined first because of its fundamental significance to the study. Rural, a qualifying adjective, will be defined, together with the term rural development, to explain the particular area of economic development being studied. Finally, the word community will be defined to provide the context

within which rural development is set, as far as the empirical content of this study is concerned.

Development

One must begin with the confession that no acceptable definition of the word "development" exists. If this is uncertain, then qualifying it by the word rural merely compounds the problem. A survey of the literature of both development and rural development might reveal an emphasis on raising incomes. Yet even this in turn has raised further questions as to what should be included in a measure of income. This latter debate ranges from one level on which questions of adjusting national income accounts to reflect a more appropriate measure of depreciation are discussed (Tobin and Nordhaus, 1972) to another distant level which attempts to replace national income accounts by a set of social accounts of total income (Fox, 1974).

There are, or would seem to be, four words which are used interchangeably: growth, development, change and progress. Although used interchangeably, the latter, progress, is also frequently subsumed in the others when they in turn are used; indeed, it cannot be otherwise:

> "Economic thinking has always embodied some concept of progress and must always do so; for the concept of value is the chief concern of economic thinking,

> and progress is indissociable from value" (Ayres, 1962, p. 231).

Similarly, the word change--a supposedly neutral term to its student, the sociologist[1]--is rarely considered in any other context than that implied by progress. In Hagen's On the Theory of Social Change one sees such an example in the first sentence of the book:

> "This book examines the factors which cause a traditional society to become one in which economic growth is occurring" (Hagen, 1962, p. 3).

Having considered two of the four words given, one is now faced with the problem of defining the words growth and development, bearing in mind the implication of the word progress which, it is argued, is subsumed within them.

There are those writers who would be careful to distinguish between growth and development. They would associate the raising of incomes with growth and the post-war literature on economic growth. Development would probably be considered a process of raising incomes and raising the capacity to consume both market and non-market components of income, involving changes in structure, in capacity and in output (Baster, 1972). Possible the strongest statement of the difference between the two terms is made by Seers who asks the (rhetorical) question

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[1] (Ponsioen, 1968). It has been argued that sociology is less goal oriented than other disciplines.

> "Why do we confuse development with growth?" (Seers, 1972).

One method for contrasting the difference between these two terms is to consider growth as occurring within a given structure and development as a change of the structure itself. According to Seers, the process of development may be considered as one which requires standing the normal relationship between these two variables on its head (Seers, 1963). Yet even here the distinction may be stretched at times. Thus, to take but one example, the common ancestry of both growth and development planning models in the Harrod-Domar tradition may be noted.

One does not find any marked consistency in the use of the words growth and development. To Schumpeter, development is a process of qualitative change, arising from within the economy:

> "It is a spontaneous and discontinuous change in the channels of the flow, a disturbance of equilibrium, which forever alters and displaces the equilibrium state previously existing" (Schumpeter, 1949, p. 64).

To Adelman, who considers both, the distinction between growth and development is made by emphasizing the same feature, discontinuity in the rate of growth, which becomes self-sustaining (Adelman, 1961). A similar emphasis may be found in the writings of Lewis (1955) and Rostow (1952).

Such qualitative changes are also discussed in Abramovitz' "Economics of Growth", who says:

> "The theory of economic growth has to do with the pace of sustained change in output of economic communities" (Abramovitz, 1952, p. 134).

Yet the fact that Abramovitz is discussing what, 20 years later one calls development, is brought home by Hahn and Mathews in their successor article to Abramovitz':

> "Our coverage is thus different from that of the survey of growth by Abramovitz... (who) addressed himself directly to the forces determining growth in reality" (Hahn and Mathews, 1965, p.1)..

This study recognizes that rural development will involve certain structural changes, yet the significance of this for the present approach lies in a somewhat different set of reasoning, which is related to a discussion on nonmaterial components of income below.[1] Stated tentatively, the reasoning is as follows.

The above discussion of development discusses the process by which it occurs. Yet ascribing to a process without further clearly stated assumptions is an absurdity (and also contrary to Hume's Law). It is for this reason that economists are overly fond of the rational maximizing agent postulate: one cannot question the ethics of economic activity, but as long as one can assume rational behavior,

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[1] See chapters 2 and 3.

one can assume such action is good and not bad.[1]

If, however, one considers development from a normative, not a processual standpoint, one is able to find a way out of this impasse and at the same time provide a more acceptable definition of the word development. An interesting issue which allows one to consider development in such a light is raised by Lewis in his chapter "Is Economic Growth Desirable?" He argues that:

> "The case for economic growth is that it gives man greater control over his environment, and thereby increases his freedom" (Lewis, 1955, p. 421)

--better health, leisure, goods and services, less drudgery, more humanitarianism, more prestige. Of the costs, these are not necessarily consequences of growth, nor are the alleged evils intrinsically so unless taken to excess. The question thus becomes one of how much growth versus other considerations, material and non-material, economic and non-economic.

Using this reasoning, one can argue that development encompasses changes in both material and non-material aspects of life (Mydral, 1974). Both of these are given weight, and both are the arena of choice. Thus changes in social structures do not merely facilitate increased economic

---

[1]See Kauder 1965 for a summary of one debate on this topic between Sweezy and Rothbard in the 1930's.

output, but the reverse could also be true. In the same vein, in discussing eccnomic growth and levels of living, Baster and Scott raise the possiblitiy of discussing both the welfare effect of growth and the opposite case of the impact of social factors on economic growth (Baster and Scott, 1969).

One of the most appealing definitions of development is given by Ponsioen, and one which this study draws upon. He defines social change as a process normally dealt with by historians, and development as a botanical term, originating out of the theory of evolution., to denote the unfolding of latent potential energy. Compared to this, which he calls growth from within, is the planned introduction of non-traditional institutions, in:

> "...a process of induced change, induced by consciously framed policies of indigenous as well as of assisting agencies" (Ponsioen, 1968, p. 13).

He continues to define development as a multi-dimensional concept. Economic development implies more economic goods, but in addition it also involves social considerations as new groups, roles and relationships are formed, moral considerations as an expression of values, and cultural considerations.

But economic development is only one part of the complex whole. To many countries and regions the problems of political development--of nation building--may be of greater

importance. Economic growth may be but a symbol of national and regional power, a means for international recognition, a means for economic and military independence, not an end unto itself.

Finally, Ponsioen considers social development, whereby human and social betterment is brought about. In such a situation the question of the economic return to education is devoid of meaning: edcation is a goal in its own right, not in need of further justification.

If one accepts these different aspects of development then the task of definition is made correspondingly more difficult. Yet this disadvantage is more than outweighed by the increased richness with which the word is now endowed. One can, for example, now disagree with the view, which poses the following conflict:

> "idealogical values...retard economic development" (Spengler, 1961, p. 33).

and instead regard development in a more generalized theory of choice.[1] Alternative ways of expressing this view have been given by Weitz:

> "...development is not a goal unto itself, but has as its object the people, their welfare and their needs" (Weitz, 1971).

---

[1] "Rural development is a widening of the range of choice for rural people" (Paarlberg, 1973).

and by Jacoby:

> "Modern development strategy considers the human factor not as a tool, but its economic and social rise as the final objective of development" (Jacoby, 1971).

The definition of development which will be used in this study draws upon the contributions of Ponsioen, of Myrdal, Lewis, Jacoby and others. Development is to be regarded as a process by which the value of a welfare or objective function is increased. This is achieved by increasing the output or availability of the elements of such a function, but their range is taken to be much wider than those normally found in economic welfare function, and should include elements which measure contributions to human welfare from all aspects of human activity.

Rural Development

In dealing with rural development one is discussing a concept whose domain is in part statistical convenience, in part spatial considerations, and in part by one particular activity, agriculture (Taeuber, 1970). Rural agricultural concepts are frequently used interchangeably. Indeed the French "l'economic rurale" is often translated into the English "agricultural economics".[1]

Smith and Parvin review several definitions of the word

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[1]As, for example, in the bilingual title of the Canadian Journal of Agricultural Economics.

rural, beginning with the most frequently used one:

1) Bureau of the Census - any place not classed as urban, i.e. an urbanized area or a place of more than 2,500 outside an urbanized area.

2) Farmers Home Administration - open country and places not more than 5,500 which are rural in character and not associated with urban areas.

3) Rural Development Act 1972 - open ccuntryside, villages, towns and small cities up to 10,000 (Smith and Parvin, 1973).

The problems with these and other similar definitions is that:

(a) rural is defined by default,

(b) the definition is uni-dimensional, whereas, as the different definitions seem to suggest, the characterization should be multi-dimensional.

Smith and Parvin proceed to develop, through the use of principal components analysis, a nine factor index for classifying counties on a rural-urban continuum. A significant weakness of the paper is their failure to compare the effectiveness of their index with others such as those given above.

Part of the difference in the size limits used to define the word "rural" can be accounted for by the differences in economic and social structures and conditions when the

respective definitions were first introduced. Thus the most recent one, of 1972, recognizes the general growth in the size of all towns by raising the rural limit to 10,000. In this study this newer definition will be used, for the above reason, as well as for the advantage of being able to compare survey data with published census data for towns in the 2,500 - 10,000 range.

The term rural development will be used here, with agricultural development as one of its subsets. Although it can be agreed that in most rural areas agriculture is the major economic activity, to neglect the remainder would be tantamount to accepting a physiocratic view of the world. As has been argued, in the U. S. in some cases the major burden of rural change has been born by the non-agricultural parts of the rural economy (Heady, 1970).

Two other reasons for preferring the rural over the agricultural approach are given by Fox's work on Functional Economic Areas (F.E.A.'s) and by the work of community sociologists in their definition of a community. Thus Fox discussed the lack of attention formerly given to problems of consumer-oriented services--such as food, clothing and recreational services, as well as education-- in agricultural areas, and developed a synthesis in the F.E.A. concept, which can be visualized:

> "...as a low-density city whose export-oriented workers are engaged in agriculture, food-processing

> and farm supply activities..." (Fox, 1969, p. 625).

Writings on rural development frequently undergo a subtle change, in name as well as in fact, becoming studies of community devlopment (Bottum, 1974).[1] The relationship between these two approaches derives from the nineteenth century view of the agricultural world as a community with common purpose and goals, contrasted with those of an arid urban-industrial society.

Twentieth century writers on the community rarely subscribe to the Weberian view of the world, some arguing that in certain cases a large metropolitan area may exhibit more community characteristics than an agricultural economy. Thus, for example, it has been argued that the belief in the village proclivity towards joint action:

> "...appears to be more an article of faith than an empirically verified proposition" (U.N., 1970).

Hence to concentrate on the agricultural components of an area's economic activity may overlook the more important or strongly held interrelationships between its inhabitants which arise from non-agricultural activities.

Finally, one may add one short but significant fact, in the form of a quote:

---

[1]The distinction between these two terms according to whether rural development programs are community or externally initiated is made by Hildreth and Schaller (1972).

> "We know the majority of people who live in rural America do not work on the farm, but in small towns" (Clark, 1974, p. 5).

Rural development is frequently discussed, yet rarely defined. To quote Dowdy:

> "...nobody knows what community development is, but everybody is doing it" (Dowdy, 1974, p. 7).

or Myde:

> "Rural development is simply making rural America a better place in which to live and work" (Myde, 1974, p. 16).

All writers in the field recognize that current rural problems are greater than those of agricultural adjustment alone, yet at the same time trace the former's problems to the latter's structural changes. Thus Heady writes:

> "...economic development as reflected through markets and public policy forces us to larger farms to substitute capital for labor, a smaller farm population, and a negative effect on income over the rural community" (Heady, 1970).

Hence previous policies and market forces have had an unequal distribution of costs and benefits on the rural population. This point is discussed by Madden, Paulsen, Bandini, in terms of the impact on marginal farmers and on nonfarm rural occupations (Bandini, 1971; Paulsen, 1970; Madden, 1970). As Heady says:

> "The nonfarm, aged, small farm and underemployed groups of rural communities have long constituted a neglected strata within our national policies and public expenditures.... The crux of the rural development problem is the distribution of benefits and costs of national economic development"

(Heady, 1972).

These impacts can be understood using Fox's F.E.A. concept. In the case of Iowa a hierarchial pattern of urban service centers is evident. With a large farm population and prior to the development of the current road system and private automobile travel, many of the services of supplying farmers and buying from them were undertaken in small, widely dispersed rural towns. As the on-farm population dropped, and as the distance which can be travelled in one hour increased, demand for the services of small rural centers has declined, in part replaced by services of larger Iowa towns. Those not benefitting are small and low-income farmers, rural merchants, service personnel whose incomes and capital assets have fallen. To talk of the goals and challenges of rural development is thus a question of defining whose goals in particular.[1] A consequence of raising this problem is a search for whether or not the goals of the various groups we identify are complementary or not.

Myde lists the challenge of rural community development (R.C.D.) as

(1) to assist in meeting a growing population, i.e. to

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[1]The problem of goals and their measurement will be discussed in greater length in chapter 2. Here the problem is raised in so far as it illustrates the definitional problem.

provide job and income opportunities in rural areas,

(2) to increase productivity whilst protecting the environment,

(3) to provide amenities for community living,

and presents the following sets of goals:

> "...better farming and ranching, expanding business and industrial development, more adequate community facilities (water, sewage, electricity, transport, communications)...educational and leadership development, more jobs and good training, decent housing, good recreation and tourism facilities for all, adequate health care and health care delivery systems and a quality environment" (Myde, 1974, p.17).

Tefertiller lists the following three objectives of rural development:

(1) expanding job opportunities,

(2) improving incomes and income distribution,

(3) providing public services and facilities to rural people (Tefertiller, 1973).

A more specific approach is raised in the question, "whose goals?" This problem is recognized in other writings when the differences in economic and social position of certain groups is discussed. Jansma and Day consider three such groups:

(a) the self-interest group, such as the Chamber of Commerce, interested in increasing incomes and sales,

(b) the equity advocates, concerned with raising per capita incomes, and improving the area's relative position.

(c) the efficiency advocates, concerned with lowering all barriers hindering the attainment of maximum economic output (Jansma & Day, 1970).

Heady discusses the various groups interested in R.C.D. in the light of changing policies and problems:

(a) farmers--interested in farm programs-- an early problem.

(b) Chamber of Commerce--concerned with more industry.

(c) urban leaders--concerned with stemming rural out-migration and more recent urban problems.[1]

(d) people whose economic opportunities have fallen in rural areas, whose asset values have dropped.

(e) rural taxpayers facing high tax burdens.

(f) youth groups.

Given that policies which necessarily benefit all six are unavailable:

> "...the crux of the R.C.D. problem is one of inequity in the distribution of gains and costs of technological and economic development at state and national levels" (Heady, 1972, p. A.5).

Out of these contributions to the definitions of rural development, it is possible to distil two approaches. The first will be called the economist's approach, which formulates the problem in value maximizing terms, recognizes

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[1] See also the Summary of Commission on Rural Poverty, 1967, and President's Task Force, 1970.

the problems inherent in making group choices, and discusses the activities and constraints over which the community's objectives are to be maximized.

The second approach will be called the process approach, associated with the sociological literature. However, although most economists would consider such processes as a means or activity, the writing on community development process in general makes no such recognition. In one sense this parallels the utilitarian approach of economics. Whatever people are engaged in doing must be of value to them, therefore such social processes should be encouraged. Such an emphasis identifies community development as "a decision-making process" (Bottum, 1974) and emphasizes leadership, community structure and participation and involvement in the decision making process in the hope that greater participation will bring about more widespread benefit from the process.

Although not completely accepting the validity of the second approach, it canvels" (Heady, 1972, p. A.5). be argued that social choices and social choice rules can encompass both ends and the means by which such ends are achieved. Thus Arrow argues that his social welfare function can be generalized to encompass values of form as well as substance (Arrow, 1963). Studies of group decision making show the value frequently placed on the accepted rules by which

agreement is reached. Such rules may vary between different groups, some stressing group harmony and cooperation more than others.

The importance of these considerations will be emphasized in the discussion of group choice in chapter 2. The other aspect, a consideration of the word community, which is discussed below, will be of value in examining certain features of rural development which will also have a bearing on that discussion. At that point a definition of rural community development will be offered.

The Community and Community Development

The tendency for rural and community concepts to be substituted for each other has already been noted. In this section the meaning of the word community will be examined together with a consideration of the significant differences, if any, between rural and community development.

Eldridge begins a paper with the words:

> "As I directed my attention to this paper I found myself needing a more precise definition of the word "community." It immediately became apparent that the community is a widely discussed and deeply analyzed entity in American life. The sociologists have devoted much time and many pages to the discussion. However, it also became immediately apparent that there is not agreement on the definition of the word community" (Eldridge, 1971a).

Nor is there ever likely to be such agreement. For, as Rossi says:

> "The search for an adequate definition to the term community is in all likelihood another search for

the Holy Grail" (Rossi, 1972, p. 93).

and:

> "The term 'community' carries with it such a freight of meanings from vernacular usage that sociologists might be much better of to drop the term and invent new cnes to cover the phenomena in question" (Rossi, 1972, p. 90).

The appropriate place to study the use of the word "community" is in the field of sociology. There it can be seen that considerable differences of interpretation exist. Certain differences arise from developments in social theory and have evolved over the last one hundred years or so.

One convenient contrast might be between the views of those who see the community as the primary social relationship, and those who hold an atomistic view of society. Thus, for example, the comparison is made by Cairns betweeen Aristotle:

> "The community is the basic order at all times everywhere; it is the order from which men derive their vital unity" (Cairns, 1959, p. 26).

contrasted with the formalists--such as Hobbes or Bentham--possessors of a strongly individualistic viewpoint.

A similar contrast is made by Friedrich, who defines the community as having:

> "...the kind of position which space time continuum occupies in physics - it is the thing <u>within</u> which political events occur -- and the kind of position which life occupies in biology -- it is the thing upon which all the political goings-on depend...man cannot be thought of outside its political community; anyone trying to live such a separate life would be either god or beast" (Friedrich,

1959, p. 23).

Such a view is also emphasized by Nisbet who stresses values as a key to the community:

> "Apart from the residual values themselves, human associations can have nc more meaning than those which exist in the animal world. But apart from communties of men, the values themselves will not long remain important and meaningful to their human beings" (Nisbet, 1973, p. 86).

Nisbet considers the individualistic view:

> "Man alone was deemed to be inherently self-sufficing, equipped by nature with instinct and the reason that could make him autonomous,"(p.91) considering it the product of a false assumption. "individuality cannot be understood except as the product of normatively oriented actions with other persons" (Nisbet, 1973, p. 92).

The above approach is historical in approach if not always in time. It is partly the product of such thinkers as Tonnies and Durkheim, who reacted against the social stresses and changes of the industrial revolution. Durkheim stressed the need to return to closer forms of social organization to rescue society from the loneliness and functional inadequacy of industrial systems.

Tonnies' reaction was even more marked. He compared the pre- and post-industrial societies as follows:

Pre Industrial Society	Post Industrial Society
Emphasizing natural will i.e. unity of goals values, beliefs, resting in sentiment and memory of common traditicns and experiences - an end in itself. Led to Gemeinschaft (unity)	emphasizing rational will i.e. choosing ends and means. Led to Gesellschaft (individualism, tension)

A breaking point in the development of the idea of community came early this century with the work of Galpin, who argued that territory was an inadequate basis for a unit of study. Two schools arose from this; firstly the ecological approach to the community of Park, and secondly, the work of MacIver and Page who stressed the "awareness of sharing a way of life as well as the common earth."

This break is convenient, for although more recent authors might re-affirm the view of Tonnies and Durkheim, they see these desirable qualities as being possible without the territorially bound face-to-face contact obtainable only in small agrarian communities. This change has had a two-fold impact. Firstly, investigators have been forced to consider their tools of analysis and the unit under consideration. Secondly, there has been a realization that there may be several ways of studying the community.

Poplin, for example, identifies two such ways (a) the community as a network of interaction, stressing the essential role of cooperation, even in conflict situations, (b) the community as a psychocultural unit - a more humanistic approach, stressing common values, norms and goals (Poplin, 1972).

Bernard lists four approaches - both old and new (Bernard, 1973):

(a) the ecological,

(b) the social class (in a functional sense),

(c) the community power structure, and

(d) the gemeinschaft/gesellschaft approaches.

Sanders also defines four approaches (Sanders, 1966):

(1) the qualitative approach: whether a community is a desirable place to live relative to others, both known and assumed,

(2) as a spatial unit - the ecological approach,

(3) as a way of life - the ethnographic approach, investigating the total culture of the group.

(4) as a social system, the sociological approach.

Although it was suggested that a convenient contrast might be made on a historical continuum, one which will be more fruitful for the present purpose has been proposed by Warren (Warren, 1970). In reaction to what has been called the utopian, value-laden approach of earlier writers, contemporary writers have attempted to provide a value-free approach, assuming that an analytical model and an objective observer will satisfy these requirements. Yet the choice of model is as likely to bias the results as are the biases of the observer. Warren proposes to make the model normative, while avoiding the utopian bias by allowing different norms to be considered as the central part of the model.

Moreover, such an approach will lead us directly to the problem of social choice discussed in chapter 2. For, despite the tendency to anthropomorphize the community, the issues of social choice are the issues faced by the community's denizens, not by an abstraction. Thus Martindale has argued that communities have no life of their own. Although Nisbet's views given above deserve weight, when one considers decision- and choice-making in a society, one needs to examine the individuals making those choices. Moreover, one may also have to account for conflict and competition between individuals, and the way in which this is resolved. As Warren says:

> "In a strict sense a community does not have problems. It is one thing to utilize the construct 'community' to denote the social organization of any given locality; it is quite another to reify, even anthropomorphise the construct community as 'having problems', 'seeking solutions', etc. Various groups within the locality are comprised of people with similar values or interests which may or may not be the same as those of other groups. To assume, naively, that one 'speaks for' any given community by defining problems from the standpoint of any one of these possible value-interest configurations is to make a hazardous logical jump" (Warren, 1970).

The "community" is therefore people. The approaches suggested above by Bernard, Polin, Sanders and others are also concerned with people. Each approach begins with a not necessarily mutually exclusive perspective, raising different questions, looking for certain answers. None is more correct than the others: each is designed for a particular purpose.

In this study the community has been defined as a political unit - an Iowa town. Suitable as a definition for the purpose at hand, it may not necessarily be so for another purpose.

Community Development Community development is concerned with goals, (Eldridge, 1971a, Hildreth and Schaller, 1972). But, as has already been mentioned, the process whereby a set of goals, acceptable to those members of the community whose well-being is to be determined by policies based on those goals, is reached, may be an integral part of community development. (See also Bottum, 1974).

> "For example, if the individual or group of individuals feels disenfranchised or discriminated against, participation in the community development process may be an important contribution to their well-being. The continuing concern about "participatory democracy" is evidence that many people consider the process a major end" (Hildreth and Schaller, 1972).

Hence in addition to

(1) goals

(2) means

(3) constraints,

community development also includes

(4) actors:

> "...an individual or some aggregation of individuals from an organization or community to the U.S. government" (Hildreth and Schaller, 1972).

Rural Community Development Defined

The problem of rural community development is thus concerned with goals, the goals of a population residing in a rural area, engaged in certain types of activities, agreeing and agreeing to disagree, cooperating and conflicting. No precise definition of the word "rural" will be offered. Instead it will be defined by default or association. From the former it will be taken to mean the non-urban areas of the country, though this too is no precise measure. From the latter it will assume the characteristics of the economic and social environment of non-metropolitan areas. Strongly influenced, in some cases even dominated by the agricultural sector, but not limited to it. In other cases, a rural area may be a former agricultural center, strongly influenced by the history and traditions of its past, yet currently engaged in many agricultural activities.

The words "rural community" taken together will be defined more precisely, though again by default. Expanded, these two words are defined as "the non-farm part of rural America". Although this may include farmers, it does so for those who live off the farm and within the unit of investigation in this study, the community, which has been defined as an Iowa town. Such a defintion owes much to the impact of the Homestead Act, and would render it invalid in many other societies. The reason for this is that earlier

patterns of farm settlement in other cultures were based on a nucleus of buildings surrounded by farmland. In contrast, the impact of the Homestead Act, by requiring farmers to live on the farm, was to physically separate the farmer from the non-farm service center. Although such rigid segregation has since broken down, it is with the latter, the former service center, that this study is concerned.

Following Eldridge, such definitions are based on custom and on usage, manifested in the legislative words and actions of various political organizations (Eldridge, 1971a). A review of the history of such concern in the U. S. for rural problems is given in the following section.

Rural Community Development in the U.S.

Sections 1 and 2 of this study have considered certain aspects, issues and problems, both within the U.S. and in other countries, of rural community development. The present section will examine briefly past and present public policy in the U.S. One examines policies as the public expressions of concern and of the choices which the country has agreed to make.

Robinson (1969) gives three types of policy measures:

1) specific government action - as in the U.K.,

2) general, nct specific action - as in the U.S.A.,

3) increased mobility.

However, the fact that increased mobility would further

compound certain urban problems, together with the fact that mobility may not be acceptable to those involved, may invalidate the effectiveness of this policy. As Robinson says:

> "It is not completely a matter of indifference to the Welshman or the Scot or the Northern Irish whether their problems of unemployment are solved in their own countries or in England.... In all these cases there is some mobility, in a few cases much mobility. But there is a large minority which is extremely reluctant to move and to leave the cultural environment which it loves and values" (Robinson, 1969, p. xiii).

Consequently, the emphasis of current policy is directed more to preventing a continuing outmigration to urban centers, and maintaining the viability of rural towns.

Earlier rural policy had a different emphasis, reflecting different conditions and problems. The Homestead Act of 1862 acknowledged a process which had begun in 1776 and which in the opinion of some was passed at a time when the tide was beginning to turn the other way (by 1910 the majority of the population was no longer rural). That this reversal was to be aided by the Morril and Hatch Acts of 1862, 1887, and 1890 could not have been foreseen by legislators interested in keeping people in farming to provide cheap food and a low wage industrial labor force.

The next significant era of rural legislation occurred

in the 1930's.[1] Unlike the legislation of the previous decade, geared to assisting economic expansion, the need of the 1930's was to protect segments of the population suffering from the depression, by raising farm product prices, providing cheaper credit to farmers, and by increasing services to farm and rural communities. In 1935 both the Rural Electrification Administration and the Farm Security Administration were established. The latter was replaced in 1945 by the Farmer's Home Administration, to grant supervised rehabilitation loans to destitute rural families, to make loans to public and non-profit organizations in towns of less than 5,500 for domestic water and waste disposal systems. In 1967 the agency's scope was extended further into the area of rural housing schemes. In 1965 the Eisenhower Administration initiated the Rural Development Program, to be renamed the Rural Areas Development Program (RAD) in 1961. The purpose of the program was to be educational and developmental, concentrating research and extension on low income rural areas. These aims were to be achieved by

(1) expanding industry and widening the range of farm jobs in areas with many small and low productivity farms,

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[1]The following material is drawn from Buse and Bromley (1975), Eldridge (1971a), and Maddox (1973).

(2) helping families having the desire and ability to stay in farming gain necessary land, tools, and skills,

(3) helping younger rural people obtain adequate education and especially improve job skills.

Overt recognition of the non-farm nature of many rural problems was made by the establishment of the Area Development Administration in the Commerce Department with the passing of the Area Redevelopment Act of 1961. This in turn was replaced by the Public Works and Economic Development Act of 1965 which established the Economic Development Administration. The Act established four types of areas eligible for financial assistance:

(1) a redevelopment area,

(2) Title 1 areas,

(3) economic development districts,

(4) economic development regions.

Without explaining each case in detail, the Act also gives recognition to another aspect of rural problems -- that they are multi-faceted and unlikely to be solved by one single approach or solution.

A further broadening of the scope of policies and programs to cope with rural problems occurred throughout the 1960's as such Departments as Labor, Housing and Urban Development, Health, Education and Welfare were empowered to handle problems in the fields of education, skill training,

housing, health, pollution, and underemployment (U.S. Senate, 1973).

The most recent piece of legislation to have been passed, the Rural Development Act, 1972, has yet to overcome its early teething problems. The Secretary of Agriculture is required to develop a set of operational goals and report to Congress prior to September 1st of each year on progress towards reaching these goals. The Secretary has reported that it is not possible, as the undertaking is currently specified, to develop such a set of goals.

The Act consists of six titles. As defined by the 1973 Guide to the Act, these are:

(1) Title I. Expansion of the Farmer's Home Administration loan and grant powers for community facilities, rural-based business firms, and farmers.

(2) Title II and III. Extension of the scope and funding for water provision and watershed protection and conservation.

(3) Title IV. Establishment of state-led cooperative fire fighting teams for rural areas and communities.

(4) Title V. Funding for university and related rural development research and extension.

(5) Title VI. Enlarging the scope of the USDA to include rural development, and granting that agency the power to coordinate the rural development work of all other

agencies.

A Typology of Rural Development Programs

This section will be suggestive rather than definitive, in proposing several alternative ways in which the above and other rural development programs can be considered. A complete classification system should be both exhaustive and mutually exclusive, but such is not the case with the present remarks which consider several different ways of classification.

A) According to purpose, design or need. Whether or not the programs are to meet general or specific needs, or particular socio-economic segments of the population. An example of such a classification would be programs to cater for problems experienced by expanding rural communities compared with those experienced by declining ones (Tefertiller, 1973; Maki, 1974). For example, Maddox (1973) compares the situation experienced by the Great Plains, namely the problems of adjustment faced by the remaining population after the large exodus, and that of the Southeast with its heavy concentration of poor unskilled farmers.

B) According to source of funds. Funds may originate from public, quasi-public or private sources, each one of these three sources itself lying on a local-federal continuum. In addition, such funds may be provided through the fiscal mechanism, through the exchange economy or through

the grants economy (Horvath, 1974).

C) In an ex-post sense, according to the degree of success of the program. Such a classification requires the economist to make heroic judgements as to what would have been the situation had the legislation not been passed, or the effort not made.

D) According to the complexity of the goals being served. This classification is closely related to (C). As the number of goals being served increases, one's ability to determine the degree of success of a program is proportionately reduced. This problem was dealt with at one level in Tinbergen's Theory of Economic Policy, and more recently as the assignment problem for international trade theory, and as a problem in multiple goal programming (Tinbergen, 1952; Cochrane and Zeleny, 1973). This problem is further enhanced when the problems of weighting and trade-off have to be faced. Where all the goals affected by a particular policy are not clearly defined or understood, it is possible for one program to be in conflict with several others due to lack of knowledge of its full impact.

Summary

The nature of rural problems, the meaning of rural community development, the types of programs, both past and present which have been used, and the way such programs can be classified, have been studied above. Given this

background the next chapter turns to a discussion of one of the problems raised above, that of the process by which community choices are made.

> "Yet few sound evaluations and even fewer rigorous field experiments have been undertaken. Moreover, serious questions exist concerning the capacity of the government both to develop and use evaluative results and of the social science research community to carry out the needed studies" (Rossi and Williams, 1972, p. xiii).

Attempts to determine the causes of the success of those towns which have succeeded in attracting new industry are often unsuccessful because of this problem. Thus one can consider the essentials of location theory, modified by appropriate considerations of marginal scale economics and transportation costs, to attempt to predict in an ex-post sense certain location decisions, but not always so. The ability to make successful judgements of this nature would enhance the ability to measure some of the benefits to industrial promotion expenditure.

CHAPTER 2.

THE PRCBLEMS OF SOCIAL CHOICE

Introduction

The purpose of this chapter will be to develop an operational theory of public choice for measuring community--in contrast to private--preferences and goals. In order to develop such a theory it will be necessary to investigate the way in which social choices are made. Using this knowledge it will be possible to develop a positive, rather than an idealistic approach to the problem (Drewnowski, 1961). It will further be shown that much of the failure of welfare economics derives from its persistence in approaching its subject matter from the wrong end.

The literature which provides the material for this chapter comes from several sources--welfare economics, public choice, positive political theory and sociology of the community. Although such studies have a history of residing in distinct spearate disciplines--at least for the majority of this century--there has been a welcome tendency for the commonality of these problems to generate new cross-disciplinary movements, as found in such publications as Public Choice.

Public Goods

Economics, despite the evidence to the contrary, tends to provide an apologetic de minimus role for the public

sector in economic life. As a result, it is frequently incapable of providing a satisfactory analysis of that which it begrudges. In many works discussion is limited to a world of private goods. It is well to be reminded of Samuelson's 1968 statement, that the pure private good is the exception, and that most goods exhibit some public good characteristics (Samuelson, 1968).

Yet even this admission is restricted to the public provision of goods. A more substantial approach would be to regard a government as providing policies. To provide or not provide goods publicly, to encourage or dissuade the provision of certain private goods (Breton, 1974). Such an approach allows the concept of public choice to be used to consider a wider range of problems and to show a more direct relationship to problems in the field of welfare economics.

Due to the unfortunate confusion which arises in discussing public goods, it is necessary to define the term and comment on alternative terminology used. A public good is defined as one whose consumption enters the utility function of two or more individuals. Following Head (Head, 1962) and other writers, both the exclusion principle and/or jointness are sufficient conditions for the existence of a public good -- though noting Samuelson's comments, one must distinguish between jointness in supply and jointness in consumption (Samuelson, 1969). An alternative explanation of the problem

is in terms of market failure where marginal cost is zero, an approach which will be returned to shortly.

A continuing source of confusion in this area arises from the use of the word "public". Publicness is defined as a property of a good, not of the means of its production. Nor need a public good be publicly provided. Various types of remedy to overcome the market failure inherent in the public goods problem have been suggested (Buchanan, 1966). Steiner has used an alternative set of terminology to partly overcome this definitional problem. Goods may be provided collectively for several reasons, one of which may be the public good characteristic (Steiner, 1969). Because Steiner's definition is fundamental to his later argument, it is worth quoting:

> "Any publicly induced or provided collective good (his emphasis) is a public good.... A 'collective good' in my definition is not necessarily a collective consumption good. Collective goods arise whenever some segment of the public collectively wants and is prepared to pay for a different bundle of goods and services than the unhampered market will produce.... When the coordinating mechanism for providing a collective good invokes the power of the state I define the good as a public good. In this definition there is a requirement that a public good must meet the tests of being a collective good. Public provision by itself does not create public goods" (Steiner, 1969, p. 25).

Steiner and Samuelson thus both avoid the all-or-nothing approach. Steiner shows that many publicly provided goods are only partly collective. Three types can be

distinguished.

(a) Goods provided due to externalities or market failure. The case of the free rider problem in the perfect collective consumption good example leads to an appeal to the state and the provision of a public good.

(b) Goods provided due to market imperfections, such as monopoly, transactions and information costs.

(c) Goods provided because of concern with the environment - such as the distribution of incomes, the nature and quality of production, and, though Steiner himself does not use the term, merit goods.

However, despite the enhanced scope of Steiner's definition, it is still restrictive in that it confines that definition to goods and services. Given that much public activity and legislation is concerned with regulation, subdivision, control or even prohibition, public goods can consist of goods, services and policies. Thus the market-determined level of output of a good can be altered by public provision or regulation. In certain of the latter instances the law may be used for this purpose without any need for some segment of the population to be "prepared to pay for a different bundle".

It is in this wider meaning that publicness will be considered, which will allow various aspects of welfare economies, public goods and social choice to be considered

together. At the same time, one must remember other taxonomies may be suggested, but they should be remembered for what they are, and not be confused with the essential characteristic of the good, which remains unchanged.

Welfare Economics, Public Goods and Public Choice

The essence of the public good problem is that of market failure. The familiar pareto-optimal rule of MRS(i)/MRS(j) = P(i)/P(j) now collapses into SUM MRS = MC. This in turn raises a further problem, for the market mechanism no longer exists to force consumers to reveal their true MRS. This was realized by Lindahl in discussing his voluntary theory of taxation. If MC = 0, then a good cannot be provided privately without destroying paretian efficiency (i.e. it would require a zero price). Accordingly, the good will have to be financed through taxation. But, in relying on consumers to pay voluntarily, there arises the problem that they will state that their own MRS for the good is low or zero. Why? Because each consumer knows that once the good is produced it will be available for all to consume -- unless the consumer can be excluded from that market. Hence both the market and non-market means of providing public goods exhibit unique problems.

The literature of public economics is thus replete with suggestions for solving this dilemma or, in a more general framework, for determining the optimal level of public

provision of goods and services. By extending this approach to include policies as well as goods and services, it can be seen that the problems of welfare economics are a more general case of the public goods problem.

Both welfare economics and public choice literature commonly approach the problem from the point of view of individual utility, showing that unlike the case of private goods, private markets do not adequately meet an individual's demand for collective goods. As a result, there is a need for collective action which governments can provide (Steiner, 1969). If there exists unanimity there is no problem as to the type and level of goods to provide, but in the event of unanimity not forthcoming, some redistribution will be implied. Formal welfare economics attempted to avoid this problem, first raised by Bergson who showed the need to make first and second order value judgements in formulating a social welfare function (Bergson, 1938; Samuelson, 1956), by proposing such rules as actual and potential compensation.

Welfare Economics

Welfare economics consists of a set of postulates, supposedly acceptable as an accurate reflection of certain social values, by which various states and policies may be judged. In positive economics an individual is assumed to possess reasonable binary preference relationships and attempt to predict choices from that basis. But for the

welfare economist the problem is not to predict but to draw welfare conclusions from looking at behavior. To do this it is necessary to examine choices made and then the preference ordering -- if one can be assumed to exist -- to draw welfare conclusions. At the individual level this is the problem of integratability: at the group level it has its parallel in the existence, or lack of, a social preference function (Mayston, 1974).

Such social preference functions as Bergson's and the compensation principle, following Robbins, have been based on the premise that interpersonal comparisons of welfare cannot be made. Little has argued cogently that there is a substantial difference between summing individual utilities, which cannot be done, and making comparisons of differences in well being, which is not a value judgement, but a fact (Little, 1957). With few exceptions (e.g. Harsanyi, 1955), attempts to provide acceptable principles of public provision of goods and of welfare economics have been based on such an assumption of non-comparability, which leads, in the words of Steiner, to a utility-consensus view of social welfare. The difficulty in relying on such an approach is apparent in the following extract from Steiner, quoted at length:

"The major objection to a utility-consensus view of social welfare functions is that it is nonoperational and does not seem to provide guidance to the decisions of real societies. Certainly we do take decisions with less than unanimous consent. Certainly too, many public goods provide benefits in excess of their contributions only to very small minorities of the society, but with the evident acquiescence of sizable majorities. One can argue that, ex post, individuals are thus revealed to value the benefits which accrue primarily to others. But this rationalization leads us back to a de facto definition: whatever the Government does is revealed to be desired by the people.

"Thus if formal welfare economics does not go beyond individual utility functions, it fails either because it justifies too little or because it justifies too much of public expenditure. Viewed from the vantage point of welfare economics, public decisions about public goods appear to be impossible to make. Fortunately other economic views are possible: economists are saved the humiliation of abandoning as barren a fertile field. It is the wasteland of welfare economics, not the reality of public decisionmaking that is the mirage.

"A partial escape from the wasteland can come from a pluralistic view of the individual. Suppose that each individual in addition to his personal evaluation of any proposed activity will also view it from the point of view of any one of a number of groups he belongs to, be it social club or trade union. If he is willing to be bound by the consensus view of the members of the group, there is a much greater possibility of consensus, first because a significant clustering of views is likely to emerge, and second because logrolling between groups can create collections of activities that command dominant majorities. Suppose individuals are prepared to accept and to be taxed for things they consider socially worthwhile, such as (say) foreign aid, wars on poverty, and higher pay for Senators, even though they cost many individuals more in income foregone than they can contribute to that individual's utility. They accept them as part of a package which they find adds to their own utility on an all-or-nothing basis.

> "The view that social choices may rest on collective values arrived at by caucus rather than by simple aggregation is more than an escape from the general impossibility of deriving a social welfare function from individual values. It has positive merit in that it embraces a view of the individual which many find descriptively accurate and analytically helpful. In this view an individual functions in a pluralistic sense with loyalties, commitments, and valuations at many levels: to himself, his family, his church, his neighborhood, his employer - and possibly also to his race, class, country, and political party. The pluralistic view is the heart of sociology, social anthropology, and much economics. If it is accepted it suggests that individuals will be prepared to act on collective issues without inevitably tracing back to the explicit question: "What's in it for me?" They may ask instead: "What's in it for the Negro?" or the farmer, workingman, etc. If they do, they invite an analysis of the views of political pressure groups, which usually have highly articulate spokesmen and well-defined programs they are seeking to enact" (Steiner, 1969, p. 36-37).

If as shall be argued below, Steiner is correct, the approach to solving problems of welfare economics and public choice must begin by examining the processes and procedures whereby mechanisms for making social choices are constructed, and studying the way in which they work. This broader approach to the problems of social choice can be noted in the more diverse nature of the subject of the past few years. Breton lists four aspects of collective choice literature, theories of:

1) public goods; mostly an existence theorem, devoid of institutional and decisional mechanisms, and concerned with equilbrium conditions.

2) democracy; little emphasis on (1), looking at the rules and transaction or information costs.

3) decision rules; includes the problem of public goods and transaction costs, but unlike (2), discusses the case of direct personal interaction, whereas (2) considers the representative situation.

4) transaction costs; concerned with various costs (Breton, 1974).

The following section draws together various approaches and provides a synthesis out of which a proposed collective choice rule is contained. In the search for such a rule (CCR) Sen's Collective Choice and Social Welfare (Sen, 1970) will be used.

Social Choice: Aspects of and a Proposal

The following diagram demonstrates the relationships between the various approaches and proposals to be found in the literature.

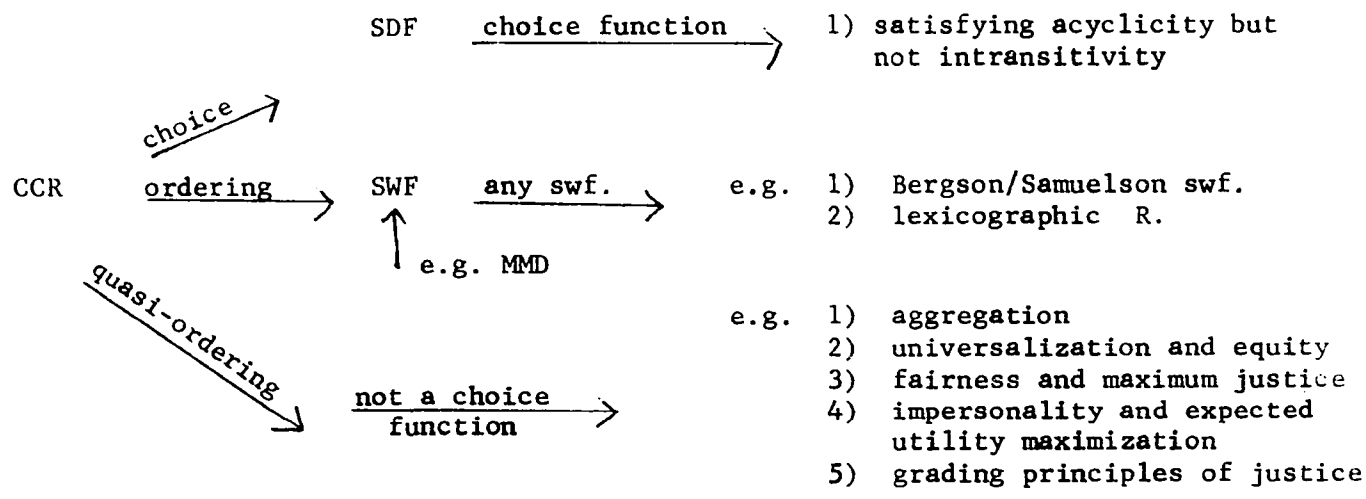

Figure 1. A Schematic Presentation of Three Collective Choice Rules.

The above approaches are discussed in the following few paragraphs. It is customary to begin with Arrow, who was interested in examining the possibility for the existence of a Social Welfare Function (SWF). He proposed a set of conditions, thought to be extremely mild and weak, but demonstrated that no SWF existed which could satisfy them. Not only the Method of Majority Decision (MMD), but also all other proposals, were ruled out in this fashion.

Following this, two attempts to resolve this dilemma were undertaken. One consists of examining the reasonableness of the criteria Arrow used. Another consists of examining the possibility of constructing other types of non-SWF Collective Choice Rules (CCR's). One such proposal is to replace the SWF by a social decision function (SDF), a less universal rule in that unlike the SWF which orders the preference relationships for every set of individual orderings, the SDF orders only a restricted set. Whereas the SWF requires reflexive, complete and transitive orderings, the latter is not necessary for a SDF, as long as transitivity can be replaced by the weaker condition acyclicity. Given that in many circumstances a choice would be sufficient, rather than a complete ordering, it would seem that a SDF would be a useful rule. However, as Sen shows, Arrow's weak conditions are sufficient, not necessary for a CCR and that not just a SWF, but also a SDF will also fail to

be satisfactory.

In view of this impasse, the conditions on choice rules themselves have also been subject to scrutiny and criticism. Sen discusses the problem as follows. It has been assumed that the above approach is value free. Yet (continuing to use Sen's terminology) the assumption that the above conditions are basic judgements is itself a value judgement. One cannot determine what is basic, but one can say what is non-basic, and dispute its validity. Thus such conditions as U (unrestricted domain), P (Pareto principle), I (independence of irrelevant alternatives), D (non-dictatorship), L (liberalism), anonymity, neutrality, acyclicity are considered, both separately and in conjunction. Neither do such rules as those relying on ordinal, ordinal-type, or on cardinal measurement guarantee any resolution of possible conflicts.

It should be noted that so far the proposals which have been considered are concerned with the existence of sufficiently acceptable rules to guide social policy making. The process by which such decisions are reached have not been considered. In the following discussion it will be seen that by incorporating the decision-making procedure into our proposal it may be possible to derive a more acceptable choice rule. This type of approach is anticipated in the distinction between values and tastes (Arrow, 1963) or

subjective and ethical preferences (Harsanyi, 1955). The distinction is described by Sen:

> "But it is important to distinguish between a person's preferences as they actually are and what he thinks he would accept as a basis of public policy given the preferences of others and given his values on collective choice procedures. Thus interepeted, there is no conflict between the two sets of preferences that he may entertain, since they are concerned with two different types of problems. One might wish that others had the same ordering R(i) as one had oneself (hence one's commitment to the R(i)) but given the preferences of the others one might accept the social preferences emerging from a particular CCR (hence one's commitment to the CCR)" (Sen, 1970, p. 66).

An alternative expression of this same view is given by Sen when considering the conditions U, L, and P. In holding to U, there is the possibility that L and P may clash. If so:

> "...the eventual guarantee for individual freedom connot be found in mechanisms of collective choice, but in developing values and preferences that respect each other's privacy and personal choice" (Sen, 1970, p. 85).

A second type of non-SWF CCR, and one which moves closer to our approach is the quasi-ordering alternative. Whereas the SWF requires reflexivity, completeness and transitivity, and the SDF requires the first two and acyclicity, the quasi-ordering only requires reflexivity and transitivity, which will be sufficient for some choice problems. Under such an approach one can consider the "bargaining approach" of Nash, the "universalization and equity" approach of Kant, Sidgewick and Hare, Harsanyi's "impersonality and expected

utility maximization" approach, and Suppes' "grading principle" of justice. Either because these will not be considered in our proposal, or that some of the essential elements are also contained in Rawls' "fairness and maximum justice" approach, only the latter approach will be discussed.

Rawls postulates two principles.

(1) In a hypothetical state of primordial equality, individuals would choose to adopt the principle of fairness--the result of a fair agreement with no vested interests. Thus fairness would be just, hence his concept of "justice as fairness". It may be noted that unlike the other equity and justice approaches, Rawls' individual only considers one possible state--the original one, not all possible permutations of possible states.

(2) Given the above, Rawls argues that the following two principles would be chosen in the original position.

(a) each person has the right to the maximum possible liberty.

(b) inequalities are arbitrary unless they work to the advantage of all. This implies maximizing the welfare of the worst-off individual, a maximin strategy as described by Sen.

It may be noted that such a procedure can generate a complete ordering, though it is not a SWF, as I is violated.

If the welfare of one individual changes, so does the complete social ordering. An alternative way of expressing this, which makes the distinction clearer, is that for a SWF there exists one ordering R arising out of (n) individual orderings of (m) states. For a Rawls' solution there is an ordering R* of (mn) elements.

What comments may be raised on this approach?

(1) Rawls assumes his original position will guarantee unanimity, a requirement for his approach to generate a solution.y (2) The maximin solution may satisfy the weak Pareto rule, but violate the strong version.

(3) The well-being of the worst-off individual may be improved at the expense of the relative inequality of someone else.

(4) Because of the purely ordinal nature of this approach, it is insensitive to gains and losses, and no trade-offs are possible.

(5) It cannot be assumed that Rawls' principles would result from a fair agreement. Only if the individual is either completely pessimistic and/or risk averse would the above results follow.

The final question Sen considers is the problem of deciding which of the above procedures to adopt. Usefulness has many dimensions: three which have been proposed are (1) power, (2) relevance, and (3) consistency (Rothenberg, 1961).

The degree of relevance will be determined by the type of problem being considered, and given the varied nature of social choice problems it can be argued that none of the above approaches is, by itself, any more "correct" than any other. Thus institutional mechanisms of social choice are based on collective choice theory, such as MMD, whereas planning decisions might be more closely related to individual preferences, such as by aggregating welfare. Public cooperation may be forthcoming if individuals are fully aware that fairness is being achieved, and are involved in the process of decision-making. In addition,

> "Just as social choice may be based on individual preferences, the latter in their turn will be based on the nature of society. Thus, the appropriateness of alternative rules of collective choice will depend partly on the precise structure of the society" (Sen, 1970, p. 5).

Thus both the nature of the problem and the type of community being dealt with will be important determinants of the degree of relevance, and:

> "There is nothing outstandingly defeatest in this modest recognition" (Sen, 1970, p. 200).

Rothenberg[1] argues that such a CCR exists within any society: indeed it is a requirement for its continuing existence. After reviewing the economic literature in the

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[1] The following summarizes Rothenberg's position: (Rothenberg, 1961).

field, he then turns to similar work in the allied social sciences. His claim is:

(1) "there exists an empirically demcnstrable regularity in the pattern of values held by the individual within any 'going society'."

(2) "this regularity centers about attitudes toward central decisicn-making processes in the community."

(3) "this consensus toward decision-making processes has deep functional significance for the continued existence of the ccmmunity in its own distinctive style."

> "My argument, then, is that there is discoverable for a given community a set of values intimately related to the basic characteristics of the community when viewed as a whole. I shall suggest that these values be considered the prevailing values dealing with economic choice in the community" (Rothenberg, 1961, p. 310).

Using Marschak's analysis of teams, foundations and coalitions, and using the family as an example of such a group which mirrors in a microcosmic manner the social group we are investigating, he continues:

> "...such consensus is discovered to be a functional requirement for the goingness of the society.... But these values are not imposed from outside onto a system of social institutions, rather, values and institutions are mutually engendering, mutually reinforcing, mutually sustaining" (Rothenberg, 1961, p. 315).

Just as a family delegates, so in a society there exist certain decision-making institutions, whose decisions will be approved in advance:

> "Such decisions are the legitimized articulations of the group's values...acceptance of these strategic social processes is a most important means by which these individuals uphold their own values. These processes become themselves important values. They are choice mechanisms" (emphasis added) (Rothenberg, 1961, p. 316)..

Hence Rothenberg's approach is an empirical one, looking at the ways a society currently orders social choices. He finds it powerful, relevant and consistent -- though not all the time, yet still leaves room for the economist to provide analysis and input, and possibly remedy whatever distortion, error and ignorance may exist in the decision-making process. The relationship of the last quote to the introduction to community development of chapter 1 may also be noted.

What such an approach lacks in elegant formality is more than compensated for by its usefulness. Because a phenomenon is not clearly understood does not mean it does not exist. Thus Steiner, speaking of the above approach, writes:

> "This view has the great pragmatic value that it invites the search for revealed social priorities without insisting on a single source of them. Personally, I find this view of the problem both congenial and fruitful. It does not dispense with individual values...it does not lead to either a minimal or a maximal role for government...it tends to pose issues of public policy in terms of whether society does in fact hold certain value judgements rather than in terms of the demonstratable inherent legitimacy of certain activities" (Steiner, 1969, p. 39).

Consensus and Conflict in The Community

In order to obtain a better understanding of Rothenberg's approach, one needs to examine "these strategic social processes" in greater depth. An element of particular concern is the emphasis placed on "consensus" in this model, over which considerable disagreement may exist.

In this and the following three sections several contributions to the discussion on consensus and conflict will be reviewed in order to provide greater understanding of the process of group decision-making. These views will then be illustrated by several examples. In the subsequent empirical work it will be possible to test for the degree of consensus in the two communities studied by examining the variance of the responses to the survey questions. It will be hypothesised that less variance is an indicator of greater agreement.

Following Hobbs, four approaches to studying community development may be identified (Hobbs, 1971).

(1) Functionalism. In this approach, "the social system is conceived as a natural system as an entity and of itself, transcendent to man."

Functionalism tends to imply a stable equilibrium, studying the integrative mechanism of adaptation, goal-attainment, integration and pattern maintenance.

The approach has been classed as conservative and teleclogical. Its proponents have defended themselves in several ways. One is the dividing of the approach into:

(a) functionalism - e.g. Parsons' work, concerned with the systemic whole and internal process, not external change (Parsons, 1961).

(b) structuralism, e.g. Moore, who is concerned with the structural part (Moore, 1960).

Hence Parsons' work can be seen as a study of a society not undergoing significant change, not as a study of stable societies. Morecver, should a destabilizing event occur, one can study the integrative processes at work under such change.

(2) Modernization. This approach combines functionalism with some elements of behaviorism. It is typified by the work of Smelser, whose model of structural differentiaticn demcnstrates that innovation is likely when the perceived failure or inadequacy of existing means is demonstrated (Smelser, 1959). Another writer in this field is Lerner, whose communicaticns approach establishes the association between effort and reward.

(3) Conflict Theories. The subject matter of these theories is the heart of the social choice problem, and will be dealt with here briefly and later on more fully.

Writers such as Dahrendorf regard the integrative and modernization approaches as being overly concerned with consensus, which in turn is concerned with normative issues (Dahrendorf, 1950). Consensus is thus seen as a group imposed phenomenon, not as a basic aspect of social existence. While not denying the existence of consensus, conflict theorists see group imposed phenomena as the outcome of coercion:

> "...it is coercion which maintains society and its subdivisions, and it is conflict which changes them."
> "...competition emerges regarding the distribution of power which eventuates in conflict and change" (Dahrendorf, 1959, p. 28, p. 30, quoted in Hobbs, 1971).

Hence, in comparison to consensus theories, which are concerned with normative issues, conflict regulation is more concerned with behavioral aspects, with the expression of conflict.

It can thus be argued that neither coercion nor consensus approaches are incompatible with each other. Both are holistic theories, i.e. concerned with social structure, and,

> "Actual societies are held together by consensus, by interdependence, by sociability and by coercion" (Warren, 1970).

(4) Social Behaviorism. Sociologists, such as Martindale, who reject the methodology of structuralism and replace it by an atomistic view of society fall into this

grouping (Martindale, 1962). Groups are seen as systems or structures of social behavior which arise when pluralities pursue their separate and collective aims in common. Social structures are the result of individuals interacting, rather than separate identities as such. Communities are seen as the way people act, communities themselves do not have any life of their own.

Arguments as to the choice of model used in studying the community are as fundamental as interpretations of community processes, for the choice of the former will in most cases determine the interpretation of the latter. Differences in interpretation thus reflect differences in approach, not in substance, none of which is mutually exclusive. Hence Rothenberg's discussion of consensus illustrates but one part of community process.

In the discussion of community development in chapter 1, the contributions of Warren and Martindale were discussed. Their significance can now be reconsidered in the light of Rothenberg's approach to group choice. Stated concisely, one can argue that social processes involve the interactions of individuals and the resolution of conflicts arising out of differences in goals, norms, and values. The way in which such resolution is effected may be as fundamental to the outcome as the substance itself. The resolution is itself an integral part of of social choice. This is important, and

needs considering further. To do so, it is necessary to consider in more detail the elements of the decision-making process, in particular the consensus/coercion debate, and also the meaning of the word power which figures in this area.

Power

The word "power" conjures up different visions for different people. The word usually carries perjorative overtones. A common view of power would be the art of persuading, or controlling. Yet the word is far more complex, and can be examined along two dimensions.

A first dimension would be to distinguish between sanction-power and choice-power. By the latter is meant the power to make choices for both oneself and for others. By sanction-power is meant the power to approve or disapprove, to allow to disallow the choices made by others. Choice-power may be a subset of sanction-power. The right to choose may be delegated, inherited or physically wrested.

The second dimension refers to the different types of power as described by Boulding. In primitive society threat power dominated--the power of the club. In commercial society there existed exchange power, in modern day society love power is also found. The desire for gratitude and love may be sufficient to induce individuals to give and be philanthropic, not the power to buy and consume, or avoid the

wrath of the tribute gatherer (Boulding, 1973).

Threat power is normally regarded as coercive power, though in one sense, both threat power and exchange power have a common basis. The only power money has in an exchange economy is that of being able to persuade the holder of some desired resouce or service to part with it. This power therefore depends on the willingness of the resource holder to part with it--at a price. But threat power is of similar nature. In both cases such power has been sanctioned. Paraphrasing Boulding, even in a situation of "your money or your life" there is an implicit exchange. And should the victim decide the life is not worth living, the predator is powerless. Hence coercion only succeeds if those being coerced are in some sense willing to be so. Or put alternatively, sanction-power works both ways, and thus conflict/coercion and consensus are inextricably intertwined. Because this is integral to the development of the theme of this paper, further treatment is given in the next section.

Consensus and coercion

One way to illustrate the relationship between consensus and coercion would be to consider the process of dispute and its resolution within a group. Most writers would seem to agree that such conflict as does exist is maintained within certain limits by rules of the game. These rules could be thought of as a constitution. For example, a majority vote

which all accept--even the losers--is one accepted rule. But sociological theory is more concerned with process than just the results, and is interested in studying the rules during the conflict stage itself.

Dahrendorf describes conflict regulation as the forms of conflict control which address themselves to expressions of conflict, not just their causes (Dahrendorf, 1959, quoted in Hobbs, 1971). Two of the necessary conditions for effective regulation are:

1) that all parties accept conflict as inevitable and that

2) they agree upon certain rules to regulate conflict. In time, says Coser, such conflict may develop certain norms which become institutionalized.

Without such rules, viable communities could not survive. Conflict is costly and disfunctional (Poplin, 1972). Cooperation underlies conflict or competition which is cooperative process in which parties involved agree upon which goals to compete for and upon ways by which these goals may be legitimately achieved. Competition and cooperation are but two types of interaction. Sanders lists five others. Each type subsumes a certain set of procedural rules agreed upon by all parties to the issue:

1) conflict

2) accommodation

3) assimilation

4) competition

5) cooperation

6) amalgamation (Sanders, 1966).

Accommodation is described as the process used for easing conflict, for seeking a way cut of the impasse, with each party yielding some ground. But this is only one of several ways by which conflict can be maintained or resolved.

The question which might be raised at this point is: "which of these six methods of interaction is predominant?" One answer would be that some, if not all, may play a leading role in different circumstances or settings. Warren provides a very clear summary of the significance of these forms of interaction, which can also serve to summarize these differing views of the community.

Warren's approach is found in several sources. One is a review of Olson's comparison between the demands of an economic model and what he sees as the ideal sociological model of the community:

> "...the prototype of the closed system, commensalistic, custombound, sacred, preindustrial community..." (Warren, 1970).

Olson reaches this view from his analysis of Parson's approach, which has been seen to be open to the attack of being regarded as conservative, and dwelling on consensus.

But, says Warren:

> "...it is a mistake to equate collectivity orientation to the values of a specific collectivity with the shared values which are necessary if that collectivity is to persist as a social system.... The shared values are not necessarily the values of the specific collectivity but those of a more inclusive social system" (Warren, 1970).

Warren continues that Olson's diversified society is compatible with not only conflict approaches, but also with systems theories, provided

(1) the shared values which lay down the rules of conflict are derived from the wider society and,

(2) these values support local conflict and diversity.

This approach (of Warren) is to select various choice-variables, which may not be in conflict. These can then be incorporated into a model and maximized, an exercise familiar to all economists. Given the weight attached to each variable, and the constraints imposed, one can derive an optimal allocation of community resources of all kinds. The price of the goals accepted can then be measured in terms of the variables foregone.

In discussing what types of variables might be included, Warren lists, in "The Good Community - What Should It Be?" (Warren, 1966).

1) primary group relationships,

2) autonomy,

3) viability,

4) power distribution,

5) participation,

6) degree of commitment,

7) degree of heterogeneity,

8) extent of neighborhood control,

9) extend of conflict.

In the case of those situations where no certain agreement over either the inclusion of or weight attached to one of these variables exists, then Warren proceeds to illustrate, allegorically, the manner whereby such choices may be made. Warren compares the idea of "trust" - which is held to be unique, for which the prophet will be willingly sacrificed, with "love", which the reconciler, or compromiser maximises. The two cannot be optimized simultaneously, but this is rarely recognized. For example, the community organization or community action approach assumes only one set of needs or objectives needs identifying. Once a viable coalition is established, to overcome "apathy", the community's goals will somehow be identified and achieved. Yet in many cases a real conflict of views may exist, with a need to choose between love and truth. To reconcile these approaches, there is a need for an approach which will emphasise differences that provide rules for confrontation, a "creative confrontation" or a "dynamic pluralism":

> "We need mechanisms that will fall short of satisfying every party to the controversy, but which will ensure the right of the dissatisfied to be heard and to continue their efforts to persuade the rest of us" (Warren, 1971).

Warren lists the preconditions for the above as:

1) avoid seeing everything in all-or-nothing, either-or terms,

2) allow fluid coalitions,

3) new techniques for peaceful change,

4) adjust formal systems to accommodate new power relationships among the actors,

5) a willingness to float with situations rather than forever insisting on controlling them,

6) improve knowledge:

   (a) better communications to explore conflicts,

   (b) better data about crises,

   (c) better understanding of conflict and resolution.

Some Comparisons Between Communities

It has been argued above that the prevailing values of a community and the rules by which conflict is expressed and resolved are closely linked. If individualism is prevalent, it is likely to be so because this is highly valued and conflict is suppressed. A more cooperative community is likely to attempt to resolve conflict, and take group decisions.

Thus Barnes discusses small Norwegian island parishes, in which equality is emphasized, even between persons of different economic status (Barnes, 1969). Cooperative action implies leadership and consensus, the latter being more important than the speed of autocratic command. The cooperative organisations within the community elect boards which in decision making begin with a trial vote which is subsequently confirmed unanimously. The explanation for this is that although people have conflicting interests, they have a common interest in maintaining existing social relationships, and therefore maintain the illusion of acting in the common interest.

Halpern describes the Yugoslav village of Orasac, with its intense identification with its own locality, next the region, then with Serbia. The villagers are "proud of what is theirs," preferring it to any other (Halpern, 1969). Similarly Williams describes the American village of Gosforth, a well-defined social unit, distrusting strangers (Williams, 1969).

In contrast, there exist such examples as Banfield's study of the people of Montegrano, described as amoral familists, with no interest in furthering the interest of the group on the community, and unable to develop community organizations due to lack of trust (Banfield, 1969). This type of attitude is brought out even more starkly by Vogt and

O'Dea in their comparison of Rimrock and Homestead (Vogt and O'Dea, 1969). The former exhibits community cooperation, with lay participation in the church, the center of the compact settlement. Homestead's inhabitants are individualistic and independent. Whereas in Rimrock citizens may opt out of community work, in Homestead one only opts in if necessary.

In Rimrock buying land, structures, schools are all cooperative ventures, it responds:

> "...to group pressures as a group. For the Mormons cooperation has become second nature. It has become part of the institutionalized structure of expectations, reinforced by religious conviction and social control" (Vogt and O'Dea, 1969, p. 148).

In Homestead, all the above ventures failed due to the strong factionalism existing:

> "They interact, but a constant feuding tone permeates the economic, social and religious structure of the community" (Vogt and O'Dea, 1969, p. 150).

Social Choice -- An Operational Proposal

In the preceding sections elements of the decision-making process have been discussed and several examples of community decision making have been presented. Out of this can be drawn two results. Firstly, the decision-making process is as important a determinant of the outcome as is any other factor. It is, as Arrow says, "especially important if the mechanism of choice itself has a value to the individuals in the society" (Arrow, 1963, p.

89).

Secondly, the correspondence between process and outcome is unclear. The outcome is a "scrambled egg" situation in which the ingredients cannot be separately identified. Not only is the decision-making process itself significant, but, ex post, it is impossible to separate it from the remaining ingredients. Hence, Arrow argues it is impossible to separate the interpretation of a social welfare function from the decision process, as the former is itself a constitution and consequently welfare judgements are themselves made by a decision process (Arrow, 1963).

Although it has been argued that ex post one cannot reduce the process of social choice into its separate components, a point of view not completely validating Rothenberg's claim (Ch. II, p. 60), it may yet be possible to propose a process of decision making ex ante which will be both acceptable to those involved and operationally useful.

The proposal discussed below is based on the work of Dalkey (1972) and Gigch (1974). Dalkey's work, at UCLA and the Rand Corporation, has become known as the Delphi--"Know Thyself"--experiments. These were undertaken by Dalkey and others to test whether or not groups were capable of making group judgements, on both factual matters and on value judgements. Says Dalkey:

> "...as the studies in the following chapters show, individuals can make numerical judgements

> concerning the relative importance of basic life values, and these numbers are not capricious" (Dalkey, 1972, p. 7).

The term "quality of life" is defines as "a person's sense of well-being, his satisfaction or dissatisfaction with life, or his happiness cr ncn-happiness."

The Delphi technique, as originally devised, was concerned with small group decision making. This has been used both to obtain group expert opinion as well as to obtain a list of variables with their respective values which are condidered the mcst important quality of life variables (Dalkey, 1972). Underlying this approach are three conditions:

(1) reasonable distributions

(2) group reliability

(3) change, and ccnvergence on iteration with feedback. Adapting this procedure, one might purpose the following model.

(a) Request the members of a community to list a certain number of variables which are considered to be important factors in their well-being.

(b) By one of several multi-dimensional clustering techniques, (for these one has to turn to the field of psychometrics) reduce the number of variables to manageable proportions.

(c) Present the reduced list to the same group, and by use of an appropriate scaling technique, rank the variables obtained in (b). Note that in the Delphi technique, respondents are asked to provide what others think, whereas here one is interested in an individual's own preferences.

(d) Repeat (c), together with the information generated by that round, to allow for change and convergence.

(e) The number of rounds will be determined by the speed of convergence, the predetermined level of variance, and the financial cost of the procedure.

In this way it should be possible to derive a system of at least ordinal social weights, which can then be normalized to establish trade-offs, though the questions of the range of the validity of such linear estimates would have to be considered (Eijk and Sandee, 1959).

Such a procedure can be considered as a subset of an overall systems analysis/design cycle for solving community problems. The following two diagrams from Gigch illustrate the approach. Figure 1 illustrates the total system, Figure 2 expands box number 1 of Figure 1.

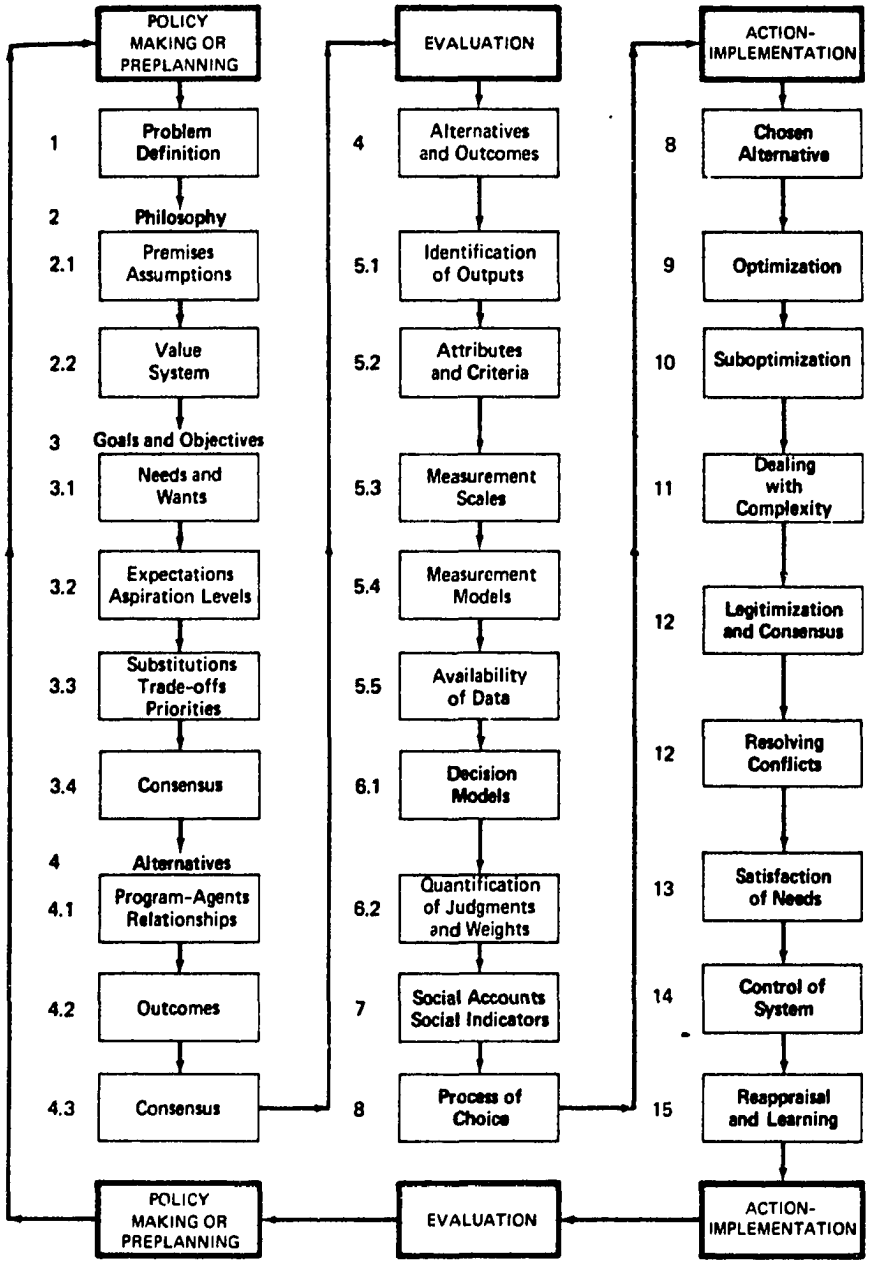
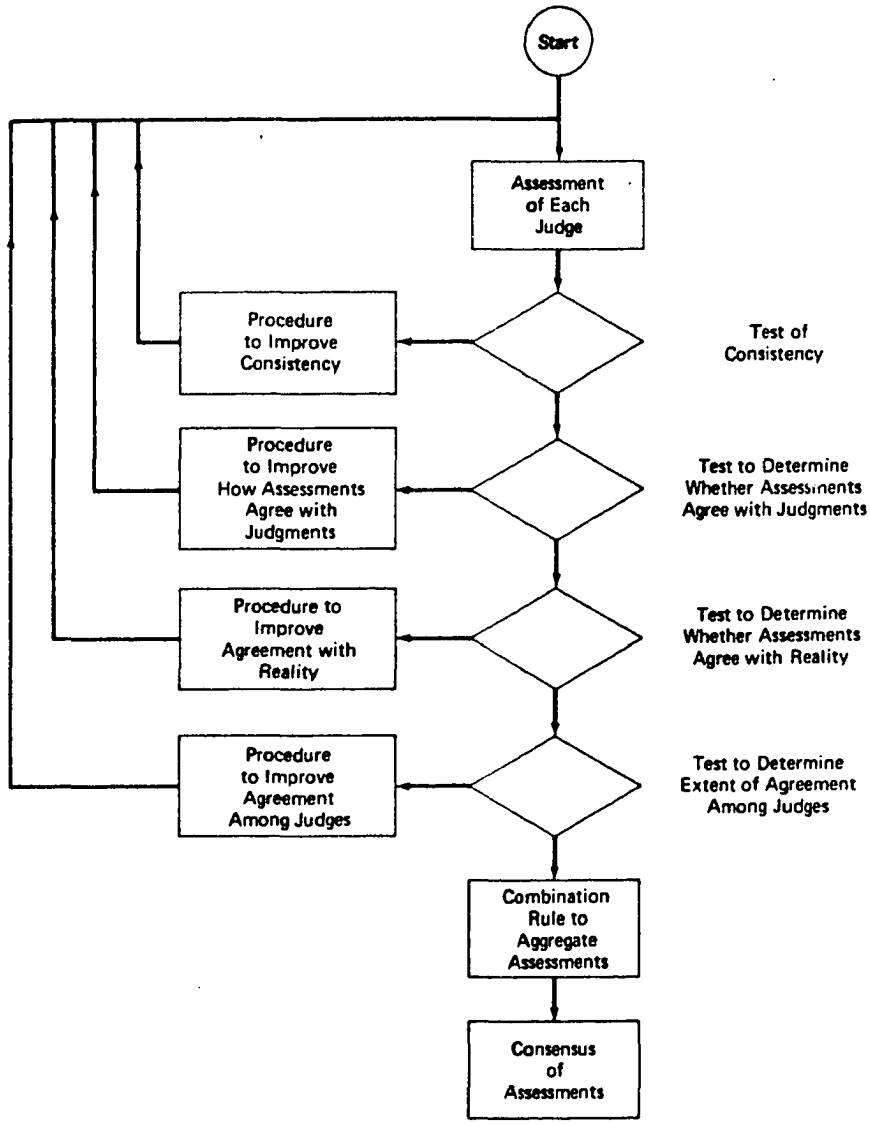


Figure 2. The Detailed Steps of the Systems Design Cycle.
(Gigch 1974, Figure 3.6)



Based in part on R. L. Winkler, "The Quantification of Judgment: Some Experimental Results," *Proceedings of the American Statistical Association* (1967), pp. 386–395. Used by permission.

Figure 3. The Quantification of Judgement and Consensus.

(Gigch 1974, Figure 7.2)

Whereas the Delphi approach and the Gigch diagrams refer to expert judgement or decision making, there is no reason why a suitably modified version of this approach should not be used for obtaining the judgement of the residents of a community or any other organization being studied, though the mechanics of the procedure will vary with the particular case. Thus, for example, beyond a certain size it will be necessary to sample, rather than obtain the judgements of total population.

Conclusions

Some of the advantages of this approach are now considered, in the light of earlier comments made on the problem of social choice.

(1) The above search was for an institutional mechanism. One possibility is the MMD. In addition to other defects, this

(a) violates L,

(b) takes no account of the intensity of preferences,

(c) may produce a cyclical result.

However, by the Delphi modification, (b) and (c) are overcome. In addition, L may also be satisfied by changes in originally stated preferences to accommodate conflict. To quote Sen again:

> "...the eventual guarantee of individual freedom cannot be found in mechanisms of collective choice, but in developing values and preferences that respect each other's privacy and personal choices"

(Sen, 1970, p. 85).

(2) What is being suggested is isolating the mechanisms which Rothenberg states exist within a community, making them more amenable to study and quantification.

(3) Moreover, the degree of individual participation in the process is both made clearer and explicit to each community member.

(4) The problem of aggregation is achieved by the convergence process itself.

(5) Related to the above point is the scaling process which this procedure follows. Although it may not be possible to be completely free of bias in scaling preferences, it is hoped that both individual and group weighting will be more objective than much of the recent work in social indicators and social measurement (McGranahan, 1970; Drewnowski, 1970).

(6) Problems which arise in interpreting the decisions of representative bodies, especially the degree to which the latter accurately reflect the views of the electorate, may also be overcome.

(7) The distinction between values and tastes now becomes moot. Both will likely be incorporated in an individual's process of decision making, but this is a private concern.

(8) As in the quasi-ordering approaches to which this is related, I is violated, though this is no ultimate test. But unlike, say Rawls' approach, this R* ordering could produce unanimity--either in actuality or as a limiting tendency.

The formal properties of this approach have not been deduced. However, it appears to be both reasonable in terms of the conditions one would expect it to meet, and applicable. In this way the divorce between community choice theorists and community action practitioners might be ended.

Summary

In the first chapter rural community development was defined. one of the most important aspects of that definition was the role of goals as elements of a community welfare function. In this chapter the process or procedure whereby such community goals may be derived has been discussed. Such goals are thus seen to be the outcome of preferences and the institutionalized patterns or rules of group decision making. Such rules vary with time and place, and are unlikely to be consistent over such differences.

However, the framework which has been proposed in this chapter is general enough to be applied to different situations, and yet allow for specific analysis. In this study a survey method for directly obtaining community goals will be developed, which draws upon the ideas referred to in the previous two chapters.

Despite the differences which do exist between the situation which these two towns find themselves in and the situations of towns in other countries on other continents, there is still scope for considering the approach, the problems and results of this study in the wider setting, bearing in mind such appropriate modifications as the particular circumstances may warrant.

CHAPTER 3.

EMPIRICAL PROBLEMS OF GOAL MEASUREMENT

Introduction

In the previous chapter a method for obtaining weights for community goals was proposed. It may be thought that such a procedure renders the title of this chapter redundant, but unfortunately the problems of the definition, of specification, of measurement and of interpretation still remain. The proposal in its current form is sufficiently general to be applicable to a variety of situations, but for the particular case it need supplementing by more specific guidelines. The level, on a means-end hierarchy, of the goals being studied, the size of the group, and the role of the group in a decision-making structure will be three determinants of the specific guidelines and procedures to be formulated. Each situation may require a specific set of tools allowing considerable scope and room for the economist to either provide guidance or make errors of judgement.

In the latter context, as an advisor, an economist using the proposal of chapter 2 is in no different a position from an economist using any other set of principles. The measurement of goals is but one part of the process of providing advice--the role of the welfare economist (Arrow, 1963; Bergson, 1954) and the proposal being presented here allows as much scope for the exercise of expert judgement as

any other rules of welfare economics (Rothenberg, 1961).

The Identification of Community Goals

One such role for the economist as advisor arises in the context of specifying the appropriate community goals to be considered, which in turn raises the problem of defining the boundary separating community (or public) from private (or individual) goals. Steiner has surveyed three alternative views of the public interest as found in the economics' literature.

1) individualistic utilitarianism--private markets fail to function adequately, therefore individuals demand collective action. But except in the case of unanimity. this raises the problems of redistribution.

2) willingness to pay or public expenditure approach--this raises the problem of tax structure and strategic behavior.

3) aggregate social welfare function--the Steiner-Rothenberg approach (Steiner, 1969).

Given the latter approach, one would proceed to determine the range of goals for which there is evidence of substantial support for public involvement and action. However, this by itself in turn raises the question of the adequacy of the word "substantial" as an algorithm in such cases. Four alternative approaches to answering this problem exist.

1) Evidence of public activity and interest can be taken as an indication of a public goal. Jahn has proposed these can be established either by a priori reasoning and expert judgement--"Y-criterion" variables or by statistical testing and research--"X-criterion variables" referred to in Alberts, 1970).

2) An alternative approach is to argue that no acceptable criterion of the "public interest" exists; consequently, societal goals need to be stated in a form sufficiently adaptable to be in the public interest under any conditions. These are defined as a set of meta-goals, a set of broad philosophical principles. (Alberts, 1970).

3) An intermediate approach is to look for a set of social minima rather than maxima, the former in many cases being easier to define than the latter (Brooks, 1972).

4) Each of the above three approaches may be appropriate for a particular set of problems. For this study a fourth approach is suggested for considering the range of community goals. This approach is based on the belief that--as Samuelson has argued (Samuelson, 1968)--the public/private conflict should be thought of as a continuum. Rather than searching for an algorithm which is based on an either/or assumption, the problem raised by the latter approach can be overcome by considering not "what is" an appropriate issue for public action but "how much" public involvement is

appropriate. As will be demonstrated below, this approach produces a direct link to the question of resource allocation.

An additional factor in support of this argument, and one illustrating the difference between this and the above approaches, is that the latter assumes that a goal or problem is to be found in either the public or private domain, but not both. Yet in many cases it is known that an individual may consider an issue to contain both components. Childless parents do vote for school bond issues--though possibly less frequently than do with-child families (Davis and Meyer, 1972)--and car owners also vote funding for public transportation. Such behavior may be regarded as a form of "noblesse oblige", but in the majority of cases is indicative of the fact that individuals will support community or public activity for which they may receive only an indirect benefit, if any. To such persons these are examples of an issue combining both a private and a public component.

The Range of Goals to be Considered

The above approach is an expanding, rather than a limiting one, in allowing a wider set of goals to be considered than is normally handled. If both community and private goals are combined to form one set of goals, the appropriate question then becomes one of determining which are relevant social goals to consider, and several related

issues which will be dealt with in turn.

As a first approximation, on a very general level, the problem being considered is that of the range of variables to be placed in a community objective function. The two limiting cases which can be suggested are

1) a general welfare function incorporating elements of total human activity.

2) an income-based welfare function.

In examining the latter one is studying the approach with which economists are most familiar, or, it might be said, one which economists have single-mindedly pursued.

This approach can be summarized as follows. There is a set of social activities within which is embedded a subset of economic activities. The degree to which the subset is wholly self-contained, or put alternatively, the extent to which ceteris paribus arguments are valid, the greater is the "purity" of the economist in question. Thus, for example, one may take, as an example of this approach, the use of the Economic Welfare Function as an independent subset of the Social Welfare Function developed by Bergson (Bergson, 1938). A similar approach was developed by Pigou, who limited his investigations to those commodities which could be measured by "the measuring rod of money" (Pigou, 1932).

Even in the field of development economics, whose western re-birth dates from 1944 (Rosenstein-Rodan, 1943), it

was not unusual until very recently to read that improvements in the level of national income were the means by which all aspirations--both material and non-material--could be met.

Indeed, the argument has been put even more strongly, that in modern society, not only is the economy a dominant subset of the social system, but that eventually the social system becomes a subset of the economy (Polyani, 1957). It is in this light that one can understand those attempts--especially in development economics--to integrate social and economic variables. The former were seen as instruments for improving the performance of the latter, and not as ends in themselves (Adelman & Morris, 1967; Hagen, 1962; McLelland, 1953), as a lubricating mechanism (Apthorpe, 1970).

Despite the seeming distances between development economics and other areas of economic study, it is of interest to note that dissatisfaction with the above approach developed about the same time in both fields. In the U.S., early evidence of this was the publication of work in the area of social indicators, and such works as "Toward a Social Report" (U.S. Department of Health, Education and Welfare, 1969) in the mid-1960's. In the field of development economics one can see a similar move, most forcefully summarised in a speech by Haq given in 1972 (Haq, 1972).

In both cases one can see an attempt to replace GNP as the sole indicator of social progress with a more expanded measure covering both economic and non-economic variables. One can speculate why, particularly in the twentieth century, this change was so long-coming, and why such economists as Hobson, Clark and Boulding are examples of an undercurrent rather than a mainstream. To detect any significant realization of the possible overlooked consequences of contemporary industrial society on that society itself, until recently one has had to look to such writers as Mann, Spengler, Dostoevsky (Harrington, 1966) and to the field of social psychology rather than to economics (Fromm, 1955).

Part of the explanation--by no means a complete answer but one which is significant for this study in view of more recent developments which allow this problem to be overcome--is that economic tools were, until recently, incapable of handling certain of these problems:

> "But as to the more far reaching human and social imponderables, even those who realize their importance are hardly equipped to deal with them. Economics is a quantitative discipline, and does not know how to handle such qualitative material.
>
> Its most unqualified criteria of economic progress are more goods to consume and, on the side of conditons of production itself, a shorter work week and more leisure" (Clark, 1953, p. 24).

Consequently:

> "Wants to the kind of community one wishes to live in they (economists) tend to relegate to the realms of the noneconomic" (Clark, 1953, p. 29).

At the other end of the continuum, the most expanded measure is the generalized welfare function, an example of an attempt to study a total society. Klausner gives only three examples of such past attempts--those of Whitehead, of Parsons, and of the International Encyclopedia of United Science (Klausner, 1967). In the more recent literature of the social sciences only three more have been proposed, the Roberts-Holdren Theory of Social Process, Alberts' set of meta-goals based on inspiring members of society to seek non-destructive ends and their attainment, and Fox's system of social accounts (Roberts-Holdren, 1972; Alberts, 1970, Fox, 1974). The limited number of such proposals is due to either a lack of belief in the desirability or the feasibility of such attempts:

> "No one function at present known is at the same time a synthetic measure of social advance, economic change, structural change and a whole host of other things, all things to all men" (Apthorpe, 1970).

Goal Self-Awareness

Before turning to examples of other attempts to expand the customary measures of economic welfare, several other issues need to be faced. Two of these, dealt with jointly due to their interrelatedness, are concerned with the individual's self-awareness and the individual's ability to respond to the demands of such fundamental social welfare models when survey work is being conducted.

Both Campbell and Alberts propose measures which, in Campbell's words:

> "...are concerned with the quality of personal experience, with the frustrations, satisfactions, disappointments, and fulfillment that people feel as they live their lives in our changing society. Ultimately, the quality of life must be in the eye of the beholder, and it is there that we seek ways to evaluate it" (Campbell, 1972, p. 442).

In Alberts' model the social welfare function is given by a fairness function:

$$X=\text{INTEGRAL}(\pm\text{infinity})\, g[x(k)\{w\}]x(k)(w)\,dw$$

where $X(k)[w]$: w in OMEGA $\longrightarrow$ r in R

is the welfare function for the kth individual.

which is specified as

$$X[w]=b[k](I(t),M(t),D(t),R(t),P(t))$$

where b(k) is the value of the social welfare function to the kth individual, given by

$$\frac{U[s(k)n)]}{U[S^*(k)(t)]}$$

where the numerator represents the utility of the state at time = t, and the demominator represents the utility of the saturation state S*(k). The 5 elements in Alberts' function are:

1) I - inspiring members to seek non-destructive ends,

2) M - manufacturing enough goods for individuals to possess,

3) D - distributing, making goods accessible to all,

4) R - providing resources to purchase goods,

5) P - protecting the access to the above.

Both the difficulty of attempting to measure such variables directly--forcing a need to search for surrogates, or indirect indicators (Gross, 1966)--and the question of whether an individual's perception of $U[S^*(k)(t)]$ can be taken as an adequate measure of welfare are in many respects a reappearance of those same issues which exist in the use of utilitarianism in economic analysis. It would thus appear that this present apprcach offers no easy solution to this impasse.

Even if these problems did not exist another set would, causing further difficulties.

Goal Hierarchies

Even neglecting the semantic problems caused by differences in terminology, it would appear that many attempts to develop a social welfare function have not faced up to the problem of a hierarchy of goals--though Maslow's work would be an exception (see Appendix 1). Thus one may take health as a goal, but question whether it is basic, or a means to some other more basic goal. One may then consider shelter, and consider whether or not this too is a basic or nonbasic goal, and if not, whether it is one means to providing health. It is probably in this field, as much as in any other, that the role of economist or other social

scientist is crucial in providing advice. Yet, despite the crucial role that such advice would play, one would search in vain to find much work in this area.

The two areas which offer the most potential for locating contributions to this problem are the work done in aggregation, and that of the theory of quantitative economic policy. However, the former has been more concerned with developing necessary and sufficient rules for collapsing the size of a model for computational convenience. The latter has been applied to models of a few highly aggregated variables as a result of either lack of data or of computational necessity. As a result neither has addressed itself to the problem of the hierarchy of goals, with the exception of the work of Kirschen and Morissens (1965).

In their work the authors make the distinction between

1) aims
2) objectives
3) instruments.

The first are very general, such as material welfare, promotion of human values, and equity. Various objectives are given, such that in the case of equity full employment, price stability, internal competition, education and other objectives would contribute to this aim. Instruments to achieve, for example, full employment include instruments of public finance, of money and credit, of direct control and

changes in the institutional framework.

Such as schema as this is a first step in overcoming one certain outcome of the failure to develop such a hierarchy, that of double counting. If, for example, one includes both the level of employment and the level of the public debt in an objective function, one runs the risk of counting the same element twice. As will be shown below in the section on measurement, such a problem arises as a result of using more than one dimension without specifying a functional relationship to relate the different spheres to each other.

In the price system--despite its other disadvantages--this problem does not exist, for all the prices obtained lie along one scale and are therefore subject to various operations, including aggregation. Yet the success of economics in doing this is as much due to the limited scope of the economist's objective function as to any inherently superior model or technique. And it is in the area of trying to develop a more general welfare function that the problems of inconsistency and double counting become more complex and, as yet, intractable.

Moreover, this problem is further complicated by the fact that in many cases the true model specified would be interdependent rather than independent. such that each aim would be affected by more than one objective, and each objective affected by more than one instrument. Thus, even

if the above specification problem could be solved, the identification question will still have to be answered before double counting is avoided.

Examples of various studies which, to varying degrees, have had to encounter this problem are given in Appendix 1. An illustration of the above problems is given by the various studies referred to by Dalkey, in which individuals list all contributing factors to the quality of life. By a pairwise comparison technique these are then reduced using a clustering or aggregation procedure, to provide a core of variables. These are then weighted.

The Sensitivity of Weights

However, by implicit assumption (or by neglect) these weights are assumed to be constant, thus obviating the need to develop an index to measure different weights at different levels on that index.

The question is not normally phrased in a "how much of ..?" format, although in certain cases one could expect preferences to exhibit discontinuities, especially where strongly held views are concerned. In such cases of absolute value, no trade-off is likely to be found. In other cases weights are likely to be constant. However, in other cases, at least over some range of the preference function, one would not expect that a specific weight be invariant or insensitive to the levels of other goals. Moreover, if it is

assumed that weights will depend on income levels, and it is desired to measure income effects, then it will be necessary to develop some type of index for this purpose.

If, however, survey costs do not permit this full procedure, it becomes necessary to consider whether to reduce the number of rounds of feedback and iteration, or omit the first stage of the survey and present a list of core variables to the sample households. By choosing the latter approach one runs the risk of dictating what are thought to be the important variables--"armchair theorizing" in Dalkey's words (Dalkey, 1972)--although several studies have pointed to the variables frequently developed are quite common from one study to another, and that 10 or 12 variables usually explain a very high proportion of the variance in quality of life studies. Yet as the attached list (Appendix 1a) shows, it would be no easy task to determine the common variables in the four studies reported by Dalkey. To take one example, novelty appears in (1), (2), and (4), newness appears in (3), and the two could be equated. But individuality only appears in (1), aesthetic in (3), self-respect in (4); it would be difficult to decide a priori on the appropriate pairing. In some cases one is faced with a semantic problem, and in other cases a more substantive one.

Rural Goals - How Different

In dealing with a study of rural communities, one is also bound to raise the issue of whether or not there exists a separate set of goals unique to rural people. This question can be discussed in two contexts. The first, related to the preceding section, concerns the level of goals being considered. It would appear from the literature that certain problems arise in rural communities which do not appear in the literature dealing with other groups. This, however, may be due to a difference in the level of goals being considered, not to any fundamental difference. Moreover, it would appear that many of these are differences in supply conditions which pose uniquely rural problems (Jones and Gessaman, 1974).

"Measurements of community variables are scarce" (Miller, 1970, p. 272). Only four studies appear in this reference. Several examples were given in Chapter 1, although no systematic basis or reasoning for their selection was given. Thus, as an example the following four goals are given: a desire to:

1) avoid a high population density, congestion and other perceived ills of the "big city",

2) avoid the hardships brought about by economic decline or stagnation,

3) keep or preserve a rural environment,

4) be able to sell locally-held assets that are increasing in value.

The authors justify their selection by saying:

> "In our work we have found the following general goals widely held by leaders and residents of nonmetropolitan areas" (Marner, Wallace and Goldman, 1975).

Five goals or goal areas which have found wide acceptance recently are 1) population, 2) income, 3) employment, 4) housing, and 5) the quality of community facilities and services (U.S. Senate, 1973). Another very similar set is contained in The Economic and Social Conditions of Rural America in the 1970's (U. S. D. A., 1971). 1) population, 2) income and employment and poverty, 3) health, 4) education, 5) housing, 6) government services and facilities.

While it would be difficult to define these as exclusively rural goals, other writers have attempted to identify specifically rural or agrarian values. One reference discusses the cardinal points of the agrarian creed--independence, the fundamentalism of agricultural economic activity, and the natural farm life (Rasmussen and Baker, 1970). Other writers stress the personal interaction and face-to-face communication in both commercial and social affairs, compared to impersonal, mass media communication, as a rural preference (Bailey, 1970; Copp, 1970).

However, one cannot conclude that there exists a substantial difference between rural and nonrural goals based on the above argument alone. Moreover, in the face of the changing understanding of the "community" (see Chapter 1) such a view would appear to be more idealistic than realistic. What may be true, and what is frequently mistaken for differences of goals, is that rural opportunities, activities and possibilities are not the same as those of a metropolitan area. Such differences in either the hierarchy of goals or of specific context should not, therefore, be confused with goal differences per se.

Approaches to Goal Specification

In the previous sections several problems concerned with the specification and definition of goals have been discussed. In this section several different approaches to expanding the restricted economic welfare function, in response to the criticisms levelled at it, are reviewed. Such differences in approach are both real and taxonomic, reflecting different backgrounds and purposes on the part of the proponents. A common factor of these measures is the belief that by expanding the welfare set to include variables not measured directly by GNP, one can obtain some other measure which is more than just a monotonic transformation of the former. Some of these approaches will be discussed below.

1. The National Accounts Approach

The ethical and value laden basis of income accounts is often overlooked, leading to specious argument and fallacious comparison. It is seldom realized that:

> "...an 'accounting theory' is central to any culture. To the extent that cultures differ, ideas of what is 'wealth' will also differ" (Gambling, 1974, p. 106).

Included in the set of necessary conditions for such an adequate theory is a meta-theory of:

1) values and some method of measuring the contribution of given situations in terms of such values,

2) the whole social culture and economic system--its composition and its function.

Several suggestions have a common basis: that the principle of national income accounting is satisfactory, and can be used to measure noneconomic variables in such a manner as to broaden the GNP measure, but not demote it. It is thus assumed that the problems of specification and measurement (to be discussed below) can be solved. All such approaches involve weighting nonmarket components of income. The scope of these varies from the most ambitious--to measure all human activity--to the least ambitious, to correct defects in the current reporting and accounting techniques of national income analysis.

Underlying most of these approaches is an idea which can be used to resolve such paradoxes in national income

accounting as recorded output falling if a male marries his housekeeper (though female marrying her valet would be equally appropriate). Becker proposed a theory of the value of time, by which all time could be given a value whether spent in pursuit of market or any other form of activity. Using comparative static optimization procedures he developed a set of first order conditions intrinsically no different from those commonly taught (Becker, 1965).

a) Tobin and Nordhaus (1972): This approach is the least ambitious of those reviewed here. Their measure of Economic Welfare (MEW) "is largely a rearrangement of items of the national accounts". This is achieved by

1. reclassification of final expenditures, to avoid double counting. The following items are rearranged:

.i. Capital consumption

.ii. Growth requirements

.iii. Instrumental expenditures, e.g. police, sanitation, road maintenance and defense expenditures.

2. imputation for capital services, leisure and nonmarket work.

3. valuing the disamenities of urbanization.

Their conclusions are as follows. MEW is greater then NNP, and has risen during the 1929-1965 period tabulated. Moreover, the rate of increase may have been greater than the rate of increase of NNP. However, depending on certain

assumptions made, the opposite conclusions may be drawn, and the rate of increase of MEW may have been almost zero from 1945 to 1965 on this basis.

b) Adelman and Morris (1973): This is both more and less ambitious than the above approach. It is more ambitious in that it attempts to measure the trade-off between certain variables not considered by Tobin and Nordhaus, especially distributional criteria, and less ambitious in that no overall accounting scheme is proposed.

c) Fox, Isard, Berliner (Fox, 1974; Isard, 1969; Berliner, 1972): Whereas the above approaches "are essentially efforts to patch up an antiquated method of social accounting" (Alberts, 1970, p.15) these three contributions propose a substantial overhaul of that system. Berliner's work draws upon the Generalized Media of Exchange proposed by Parsons and Parsons and Smelser (Parsons, 1967; Parsons and Smelser, 1956). This will be developed here, noting that it also applies to other works discussed in this section. Using an input-output framework, the functionalist approach can be described as follows.

	A	P	G	I
Adaptive				
Pattern Maintenance				
Goal Attainment				
Integrative				

The next step is to tranform the four functional subsystems into concrete structures, or institutions. Given these, it is possible to measure the interaction between subsectors in just the same way that economists record interindustry transactions.

	E	F	P	L
Economy				
Family				
Policy				
Law				

Isard's approach is similar, with the addition of a regional dimension to the matrix. As such this is a difference of degree, not kind.

The work of Fox uses all of the above approaches so far discussed, and is the most ambitious in scope and quantitative measurement so far discussed. Using the concept of media-exchanges, Fox develops optimal conditions for allocating time amongst all economic and noneconomic activities. The latter is expanded from the four basic

subsystems of Parson's work to cover some 198 time-consuming activities as recorded by Barker (Barker, 1968). The objective of this approach is to develop a set of social accounts, similar in principle to national income accounts, but with the added advantage of prices attached to nonmarket activities. The theoretical basis is shown to be an extension of the optimality conditions for measuring national income.

2. Survey Method, or Social Indicators

The one common feature of these studies, and that which also sets them apart from those above, is the attempt to develop an index of certain variables seen to be pertinent to measuring welfare. In some cases these indices are seen as supplementary to GNP, in other cases as being complete enough to provide sufficient information upon which to draw conclusions and base policy prescriptions. In addition to private and foundation research work, such studies have also been undertaken by government agencies, by the U.N. and by the OECD. Due to their diversity some injustice will be done by including all of these under this heading. Only a few will be discussed here to present a flavor of the approach.

a) Easterlin (Easterlin, 1974): "Does Growth Improve Human Happiness?" Easterlin's approach draws upon various earlier studies of this question. By combining them, Easterlin is able to see the effect through time of an

increase in income on human satisfaction. In all cases the association is positive, yet when an inter-country comparison is made, no correlation at all is found. Easterlin explains this paradox by use of Duesenberry's relative income hypothesis: if everyone become better off, then one's own standing is unchanged and no increase in well-being is perceived despite the absolute increase in income.

One implication of this study for our purpose is the problem this raises for inter-country comparisons. If one accepts the validity of this hypothesis, then each survey becomes an in sui generis case.

b) The Delphi Experiments (Dalkey, 1972): Dalkey's procedure has been described above (p. 74 , chapter 2) in his quality of life (QOL) studies. He concludes that the ratings of the QOL factors "are all favorable to the hypothesis that Delphi procedures are appropriate for formulating group value judgements" (Dalkey, 1972, p. 31).

Similar success is also reported in other surveys undertaken by Dalkey and colleagues using the Delphi approach.

c) Social Indicators: Dalkey's work on the quality of life raises an issue which generates some confusion. In many contexts the term "quality" is used in contrast to "quantity", the latter being measurable but not the former. In the context of Dalkey's work and those of other writers,

the qualitative aspect refers to the multi-attribute or heterogeneity of a concept or goals, not to an unmeasurable property (Castle, 1972).

A second cause of confusion in the social indicators movement has been lack of a theoretical basis to guide its development and use, and hence a lack of consistency in the early output of this field. To answer this criticism sociologists have called for a theory to parallel that of economic accounting, a social systems basis to support social indicators (Brooks, 1972). In this sense, social accounts will provide the framework within which social indicators can be developed as goals.

The most complete attempt at developing such a system of social accounts, referred to above, is the work of Fox (Fox, 1974). That such a system has to be more than a mere extension of the economic accounting framework is due to the different dimensions and perspectives of other social sciences. Thus, as Olson says, the sociological ideal deals with the formation and transmission of wants and beliefs, the minimization of alienation. For this reason the "doing" or process emphasis of sociology contrasts with the "being" or existence emphasis of economics. However, most sociologists would subscribe to the same rationality postulates underlying individual economic behavior, giving a common base for both approaches, and providing a unifying thread. Yet at the same

time--for reasons discussed elsewhere--it is possible to argue that such social accounts may suffer some of the same conceptual weaknesses as well as the strengths of economic accounts.

Confusion over the purpose and aims of various indicators can thus be seen as the result of theoretical infancy. The following hierarchy of levels of analysis, as proposed by Brooks, satisfactorily eliminates such problems:

a) national goals - which are difficult to measure

b) quality of life - as another perspective of (a)

c) social indicators - as measures of (b) (Brooks, 1972).

Similarly, the 1972 Social Indicators Report describes

a) areas of interest

b) concerns within each area of (a)

c) indicators of (b) (Office of The President, 1973).

The choice of whether to develop a set of indicators or a set of accounts is thus not a question of competing alternatives, but a matter of degree or level of analysis. The need for indicators arises from the difficulty of quantifying and measuring abstract concepts and goals. Social indicators consequently serve a role as concrete proxies for such intangibles. Several examples are given in Appendices 1 and 2.

Olson defines a social indicator as follows:

> "It is often possible, in other words, to get "social indicators". A social indicator, at least as this writer defines it, is a non-monetary measure of social output or performance -- a measure of welfare or illfare to which no price has yet been attached. It can be used in the national income and produce accounts. A measure of the volume of a public good that is of direct normative interest to a society would then have to be a social indicator. Since preferences will often be concealed, and will in any event differ for people with different preference orderings or value judgements, it is utopian to expect consensus about the monetary value to be placed upon each social indicator. Rational public decisions about resource allocation will of course require that the politicians in power put some value or price on the alternative outcomes that could be obtained by using the same public funds in different ways, but there will rarely by a consensus that they have used the right values. But, to repeat, there is no reason in principle (outside the defense and international relations area) why tolerable physical or social indicator measurements cannot be obtained" (Olson, 1973, p. 331-2).

Social indicators are thus seen as concrete proxies for less tangible goals. The appropriateness of a set of indicators is thus dependent on the nature and level of the goals being studied. Andrews and Baster, using different terminology, draw a distinction between direct (subjective or perceptual) and indirect (objective or phenomena) indicators (Andrews, 1974; Baster, 1972). The former have the advantage of measuring difficulties, whereas the latter are more readily available but pose a problem of selection, justification and interpretation.

A Measure of What?

Clark's comments on the reasons why economics and economists have traditionally limited the scope of their work have already been noted.

As can be seen from QOL variables listed above, such an indicator is radically different from the current GNP figures, in both concept and scope. A question which is raised by the above debate is "what does GNP measure?", but it now becomes possible to ask "what should GNP measure?" The same questions have been raised in different forms, such as the (more than taxonomical) problem of whether one is using a set of income accounts or social accounts. A more recent question is over whether or not to expand the income accounts to incorporate the data of the social indicators work, or whether to keep the two separate, to use the one to supplement the other.

The problem has been summarized by Moss (1973). Present accounts are limited in the scope of their measure of economic performance to that produced for sale by enterprises. However, this alone has a substantial welfare dimension. But the questions raised lately include:

(1) should the measure be extended to the household, government and even environmental sectors?

(2) should the measurement of economic performance by enterprises be re-examined?

An Expanded Accounting Measure

In favor of such changes, with varying degrees of conviction, are the following.

a) Bernolak (1973): GNP is not a welfare measure itself, but "many, if not most elements of welfare are, in fact, measured by it." However, rather than proposing a unique measure, Bernolak proposes an integrated framework of social indicators, distinct from an improved set of national accounts.

b) Juster (1973): "We want the accounts to record changes in the material well-being of the community." This means recording market production but not at the exclusion of "registering nonmarket activity to the extent that it bears directly and measurably on material well-being."

But Juster qualifies this by saying

> "...economists generally have no desire to turn the accounts into some sort of happiness index in which one's ability to get along with one's wife or children...constitute(s) potential measures of performance. These may well be more important considerations than mere material goods and services, but they are not within the purview of the economist or the social accountant. Thus the system of social accounts is inherently limited in what it does and ought to try and measure...".

To provide the information "which cannot be neatly fitted into a uniform social accounting framework", Juster calls for the use of social indicators. Yet despite this, Juster compares the usefulness of social indicators measured in heterogeneous units and economic and social accounts

measured in homogeneous constant dollars, discusses the latter's advantage over the former, and concludes

> "I would rather see the translation process carried out within the framework of an economic and social accounting system that carried out piecemeal and ad hoc by whoever has a particular ax to grind."

A Restricted Accounting Measure.

At the risk of oversimplifying and possibly doing them some injustice, the following authors seem to restrict the use of GNP to a more narrow interpretation.

1. Meyer (1973): asks the question "Should GNP measure social welfare?" and replies "To my knowledge, no responsible professional has even suggested anything of the kind". What is in question is whether GNP can provide information "that might better measure economic welfare" (emphasis added).

2. Tobin and Nordhaus (1972): "GNP is not a measure of welfare.... GNP and NNP statistics are the economists' chief tools for short-run analysis, forecasting, and policy and are also indispensable for other purposes". Thus they would not want to see GNP statistics transformed, but instead propose to provide a second set of statistics, their MEW, to measure consumption rather than production, and a truer index of economic welfare.

3. A more forceful denial of the usefulness of measures of welfare is Jaszi (1973):

> "Such measures are not possible because they have no boundaries; because they try to quantify what cannot be quantified; to value what cannot be

> valued; and to roll into one, aspects of human activity that should be kept apart." Moreover, says Jaszi, "I doubt very much whether measures of welfare based upon a reconstruction of individual preferences would be as useful as they are generally said to be." And if we leave such judgements to the national income accountants instead, "This would put the national accountant in an impossible position, and the results he produces would be of no use to the policymaker."

That there should be disagreement on this issue should come as no surprise. Despite the argument over semantic issues, despite the possible disagreements over taxonomy, the basic problem still remains unresolved. In reviewing the above contributions one is made aware of the potential scope for expanded measure of welfare, but also of the dangers and pitfalls from doing so. However, it is equally true that the sins of omission, of not attempting to expand the boundaries of welfare, may be greater than the sins of commission from trying too hard.

The Quantification of Intangibles[1]

As pointed out above, the difficulty of measuring the more intangible aspects of welfare have caused social scientists to either ignore such areas or to search for alternative ways of studying such problems, such as through the use of various indicators. There are still those who

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[1]In this context an intangible is not something which does not exist, but a phenomenon or state which cannot be measured directly.

would argue that "lower priority should be given to the less tangible measures of self-images, community images and opinion polls of people's attitudes towards , and opinion polls of people's attitudes towards...programs." (Cain and Hollister, 1972, p. 112-3), concentrating on the more concrete "measures of behavior and of tangible changes".

In the literature dealing with this area there is an unfortunate tendency to confuse two separate but related issues--the development of a scale of measurement and a function relating that scale to some other property being studied. Thus, as an example, in the case of health,

(1) $$h=h[x]$$

where (x) is a scale of the quantity of health inputs, whereas h(x) is a function specifying the relationship between the health 'input' scale and the output or benefits derived. In the case of,

(2) $$h = x$$

the correspondence is such that one can overlook the distinction, but in all other cases both components are needed.

Although these issues need to be dealt with separately, both of them have certain common properties which arise in problems of measurement and scaling. Thus in the case of (1) it is possible that x is itself a function of several subcomponents of health inputs:

$$h = h[x(y)]$$

where y may be a vector of inputs. To understand these issues requires an understanding of the principles of measurement, before these two areas can be dealt with and the problem of weighting them tackled.

The Nature of Measurement

Using Torgerson's definition, measurement is defined as the

> "process and rationale involved in the construction of a scale or measuring device and the properties that can be ascribed to it" (Torgerson, 1958, p. 13).

By use of the number system it is possible to develop an isomorphism specifying the relationships between the properties being measured and the characteristics of the number system.

The real number system possesses the characteristics of

(1) order,

(2) distance,

(3) origin.

In discussing the use of the several available types of scale one is considering the relationship between the above three characteristics and the properties being considered to determine how much information is being conveyed by the number system. On the other hand, in studying the different kinds of measurement by considering the meaning of the above three characteristics, one is looking at the kinds of

information being conveyed (Torgerson, 1958). The former is more relevant to problems of quantitative analysis; the latter to methodological and interpretive problems.

Types of Scales

The classic division of scales (Stevens, 1960) into

(1) nominal,

(2) ordinal,

(3) interval, (or cardinal)

(4) ratio,

has more recently been revised by Pfanzagl to

(1) nominal,

(2) simple ordinal,

(3) ordered metric,

(4) cardinal,

where Stevens' cases (3) and (4) are examples of Pfanzagl's case (4) (Pfanzagl, 1968).

Torgerson has argued that scaling is concerned with the properties of an object, not with the object per se, and consequently, both the above two scales and Coombs' five-point scale, all of which begin with a nominal scale, confuse these two aspects. Accordingly he has proposed the following 4-fold definition:

	No Natural Origin	Natural Origin
No distance	Ordinal	Ordinal with natural origin
Distance	Interval	Ratio

In moving from a low to a high power scale, the number of restictions on the three charateristics of the number system increases, reducing the arbitrariness of the scale proportionately. The higher order scales can thus be used to produce more powerful results, but against this must be offset the increased complexity and demands placed upon the investigator and, in a survey instrument, upon the respondents themselves.

In contrast to the above uni-dimensional scales, in which a known functional form is used to reduce the dimensionality of a problem, in those cases where such knowledge is lacking some reduction in dimension is still possible through the use of multi-dimensional scaling techniques. The use of such scaling techniques in economics is rare; such examples as can be found being attempts to expand the scope of economic analysis into areas for which no generally accepted thecretical model or common scale exists (Adelman and Morris, 1974). In the metric or n-dimensional Euclidean method, the procedure is to order the Euclidean distances, d(j,k), along the n axes:

$$d(j,k) = [\text{SIGMA}r=1 \text{ to } n)\{P(r,j)-P(r,k)\}^2]^{0.5}$$

j,k = indices for any two points

r = 1 ... n axes

P(r,j), P(r,k) = projection of point (j,k) on axis r.

Types of Measurement

In addition to the above scale characteristics, concern with the kinds of information being conveyed--the link between the scale and the properties being measured--leads to a 3-fold classification of measurement.

1) Fundamental measurement. This is the most powerful type of measurement, in which the different amounts of a property are related to each other without reference to any other property. Such measurement is rare in the social sciences, although psychometricians have established scales of various subjective sensations similar to those of weight and length of physics.

2) Derived (or theoretical) measurement. Here a functional relationship beteen several different properties is assumed to exist. Although used more in economics than in other social sciences it is still relatively rare even in that field as many properties used are not capable of measurement on fundamental scales.

3) Fiat (or definitional) measurement. In the social sciences various presumed relationships--which cannot be demonstrated fundamentally--are used for measurement. For example, income is a construct for the more complex

multi-dimensional concept of welfare whose properties cannot be represented in any fundamental manner.

The Classification of Scaling Methods

Based on the above properties of scales and measurement types, Torgerson has reviewed the various scaling methods used, illustrating similarities and dissimilarities in both title and content. One approach is in terms of the position of the respondent vis-a-vis that of the stimulus, or in terms of judgements versus responses.

1) Stimulus Centered or Judgement Approaches. In these, different weights are attached to stimuli due to the ability of individuals to discriminate between different magnitudes of an object. Inter-individual differences, or the respondents own biases are minimized, as the technique is concerned with comparing different stimuli with each other.

2) Response Approaches. In such cases the subjects respond on the basis of their own position with respect to an attribute. As such, unlike the above, this is a two-way analysis of variance case. Both subjects and stimuli can be assigned scale values, and:

> "...the endorsement or rejection of a particular stimuli by a particular subject is considered to depend both on his own attitude, belief, ideas or characteristics, and also on those reflected by the stimulus" (Torgerson, 1958, p. 58).

In this study the judgement method for assigning weights to various goals will be used. Weighting, or ordering, will

be based:

> "...on the proportion of times any stimulus is designed as possessing more of an attribute than any other stimulus" (Torgerson, 1958, p. 53).

In such data procedures the data is ranked, or ordered, and in all but the method or paired comparisons approach transitivity is imposed on the data. As this particular approach is to be followed in this study (see Chapter 4) a test for transitivity (or additivity) will have to be performed.

Although the response-judgement distinction may be clear in many cases, there is one area in which it may break down (Edwards, 1957; Torgerson, 1958). This is in the area of aesthetic judgements and preferences. As Torgerson says:

> "Here either approach might be used on a given set of data. Whether or not to consider the responses as reflecting variations in the position of the stimuli on a given population of subjects, or as reflecting opinions that may differ with each subject, would depend on the purposes and preferences of the experimenter" (Torgerson, 1953, p. 49).

Although this possibility still exists, the approach to be followed in this study would seem to minimize such risk.

One may finally note a link between the power of the scale being used and the complexity of the demands to be placed on the respondent. The simpler the tasks facing the respondent the more reliable, although the less powerful, the results derived. However, given such statistical tools as multi-dimensional scaling and the method of paired

comparisons, certain of the more complex tasks which would otherwise have to be performed by the respondent can now be undertaken in the analytical part of the study, making possible such developments as the derivation of cardinal scales from ordinal data (Adelman and Morris, 1974).

The Specification of Weights

The Advantages of Weighting

In order to attach weight to goals, a scale for that goal must first be defined, followed by some procedure or rule for transforming that scale into one possessing some aspect of value to the investigator. In most cases one will be looking for weights or values which can be attached to various magnitudes of a scale's properties. But the purpose of weighting has an even more fundamental role, for by the use of a common scale it becomes possible to reduce "a congeries of incomparable elements" (Dalkey, 1972,p. 89) to a unique measure or index. Several arguments, based on the possibility of weighting, have been raised by the protagonists for unitary indices (Drewnowski, 1970).

A. The Antagonists. 1) No additional information beyond that provided by selected indicators is provided.

2) Any procedure is controversial; accordingly so is the result.

B. The Protagonists. 1) Some unitary or synthetic measure is an essential criterion for making judgements and

comparisons. As a unitary index the information is conveyed more conveniently than that provided by separate indices.

2) Weighting is not only feasible, but it happens in practice all the time. "The proof of the possibility of a weighting system of social aims lays in the fact that such systems exist (Drewnowski, 1970, p. 16).

In this study it will be argued that, at least in the procedure to be described, weighting is possible and consequently uni-dimensionality can be achieved.

The Choice Weights

Both Steiner and Drewnowski review several alternative approaches by which policy makers can obtain weights.

a) Drewnowski (1970). (1) Agreement by policy makers.
(2) As an implicit prior decision, inherent in past speeches, decisions, plans.
(3) By developing index numbers and, where no help is available from the above two procedures, using one's own judgement.
(4) Based on individual utility functions.

b) Steiner (1969). (1) As inherently given.

(2) (Same as Drewnowski).

(3) To regard objectives as constraints.

Whereas these three approaches are viewed as the product of prior decisions, there also exists a fourth view.

(4) As the outcome of a political process resulting from a case-by-case confrontation.

Steiner's fourth alternative would be best illustrated by the activites of legislative bodies. But the process can be widened so that the Gigch-Dalkey approach (see Chapter 2) can encompass legislative bodies as well as general citizen participation. Two examples of such processes for obtaining weights are the Educational Goals and Objectives (Anon., ca. 1973) and the Citizen Participation in State Government (Citizen Participation Project, 1973).

However, in neither case is sufficient attention paid to the question of whether or not the scaling procedure to be used is powerful enough to allow for aggregation and the measurement of trade-offs. In the educational planning guide 18 goals are weighted for evaluation purposes, i.e. to determine the effectiveness of programs. Such evaluation is not to be confused with the needs of the policy analysis in which the need to compare alternative programs and alternative strategies can only be met by making trade-offs (Rossi and Williams, 1972).

Direct Versus Indirect Measurement

The various contributions referred to in the section "Approaches to Goal Specification" have been made by authors working in different fields and interested in different problems. One method of comparing these contributions is in terms of direct versus indirect measurement. Both are attempts to specify weights to be attached to the elements of an objective function as is required to operationalize the definition of development given in Chapter 1.

If one tries to supplement the above approaches to weighting by adding the possibility of quantitative goal measurement by survey techniques, one encounters most of the problems referred to in scaling and measurement. Certain of these problems have plagued attempts by economists to generate indifference curves empirically in order to measure trade-offs. Those that have been developed have been purely experimental and have avoided the practical problems of replicating such problems outside the laboratory (Rousseas and Hart, 1951; MacCrimmon and Toda, 1969).

Indirect measurement In this approach one attempts to obtain weights by observing actions and choices made and using this information to obtain a preference function. The most familiar exercise using this approach is the revealed preference method, for which are required two pieces of information:

(1) knowledge of prices and incomes.

(2) a scale along which the goals are measured. The former will be explained below. The latter has to be known in order for different income bundles to be ranked. As an example of such an approach one can consider the experiments by Rousseas and Hart (1951). A problem with their approach outside the laboratory is that it would require price data, which in the case of nonmarket items do not exist. Thus in the case of an individual the problem faced is to:

$$\text{Max: } W = U(X(1),X(2),\ldots,X(7)) + L(Y - \text{SIGMA } P(i)X(i))$$

$$i = 1,\ldots,7$$

$$W^* = U(i) + LP(i) = 0,$$

$$Y = \text{SIGMA } P(i)X(i),$$

For the individual, an optimal solution can be obtained by taking any one commodity as a numeraire, such that,

$$\frac{U(i)}{U(r)} = \frac{P(i)}{P(r)} \qquad i = 1\ldots r-1, r+1\ldots 7$$

However, what should be noted at this point is that the optimal level of consumption of (i,r) is dependent on relative prices, and, in solving for the demand function, the level of income.

$$U^* = U^*(X^*(1),\ldots X^*(7))$$

$$X^* = X^*(P^*, Y^*)$$

$$\text{therefore } U^* = U^*(P^*, Y^*)$$

Consequently as can be shown graphically, the solution obtained can be generated by an infinite number of

indifference curves.

Due to the lack of knowledge of relevant prices one is limited to the results shcwn by this one point.

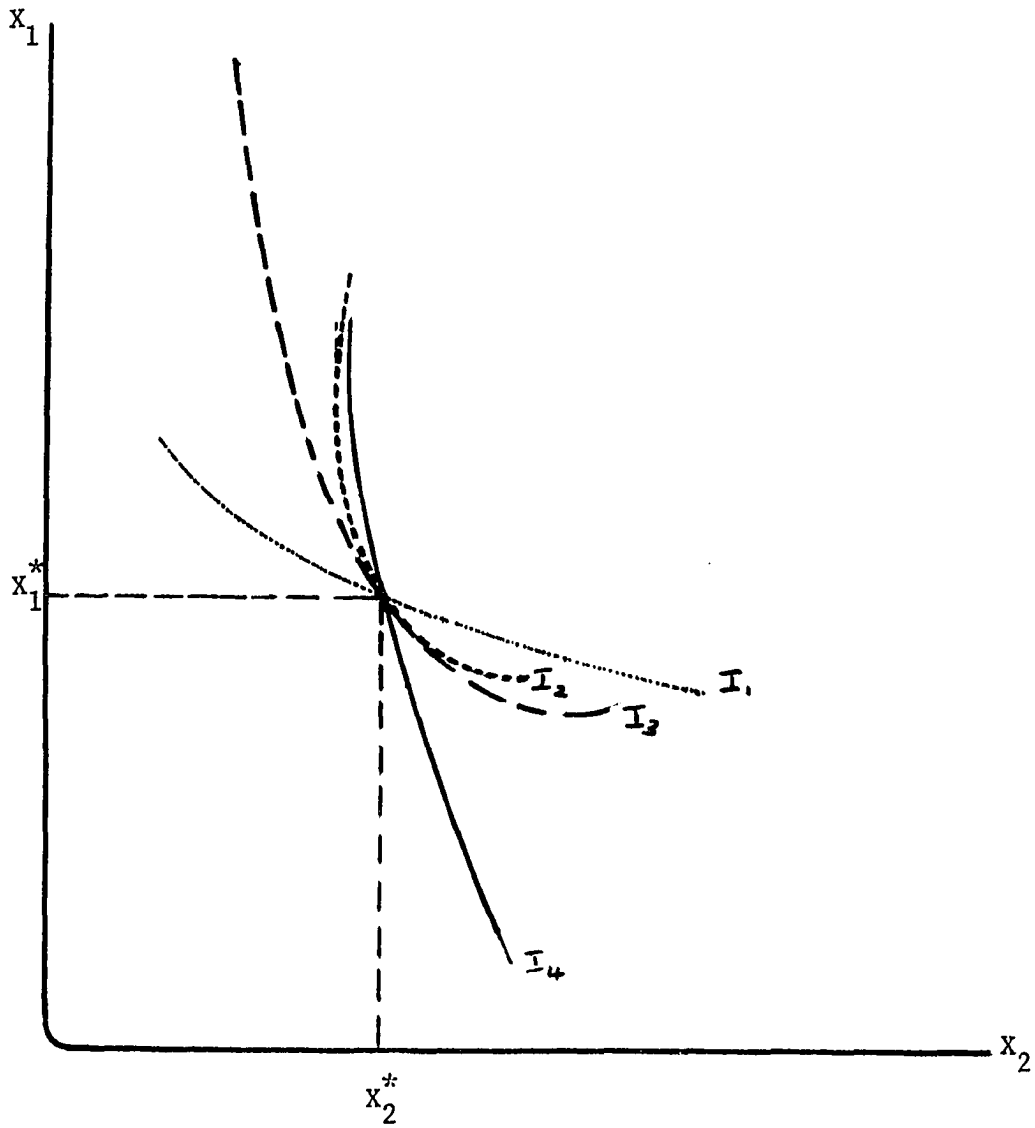

Fig. 4. Indeterminacy of the Weighting Problem When Only Expenditure Patterns are Known

In discussing the difficulties of empirically deriving such curves outside the laboratory one can make a distinction between problems which would arise in studying one individual and those which would arise in studying a group (Wallis and Friedman, 1942). In the former case one would have to study an individual for a sufficiently lengthy period to allow for price changes, but during which time it is unlikely that the ceteris paribus assumptions--constant tastes, incomes and technology--would hold. If, however, one attempts to use cross-sectional methods, one must attempt to:

> "...isolate groups having similar social status, cultural and educational background, occupational attainment and the like" (Wallis and Friedman, 1942).

but in so defining a homogeneous group one would also restrict the range or price variability necessary to generate an indifference curve.

Direct Measurement. In order to overcome the problems associated with the indirect approach, one can attempt to obtain weights directly by an experimental technique. Two of these were referred to in Chapter 1, the investigation of past decisions, and the experimental generation of indifference curves. The former approach requires, as do all the others,

(1) some scale whereby the goals being investigated can be measured, and sufficient data to perform such analysis. Where this is not available, one can attempt to derive the

results through experimental procedures.

Both types of direct measurement further assume that,

(2) the individual is capable of making choices between pairs of bundles offered. One such experimental attempt by MacCrimmon and Toda, uses a procedure of offering choice-bundles to a respondent who maps out an accept-reject region which eventually approximates to an indifference curve. However, though this obviates the need for price data, it still requires that the components of the bundle are obtained from some generally acceptable scale of measurement. In the present study such an approach was developed until it was determined that no acceptable scale of such goals as health or public safety exist. Although such scales can be developed for other purposes through the use of canonical correlation and factor analysis, such synthetic variables, whilst having meaning to the developer or algorithm, have no significant meaning to a sample survey population.

A further problem with such an approach is more fundamental then the above procedural problems. The indifference curve is a convenient tool used by the economist. It is assumed to underlie the decision process used by an individual. However, the fact that such a curve exists is not the same as saying that an individual uses indifference curve analyses in making choices. The former is an ex post explanation. Thus, if one is interested in

obtaining preferences one should develop a procedure which asks questions in a manner as close as possible to that used by individuals in making choices. It is in situations such as these that the assumptions of a model, Friedman not withstanding, are crucial.

An additional problem which has also to be tackled is that individuals do not process perfect knowledge, foresight and the capacity for instantaneous analysis. Thus, even though ex post individuals may be shown to be able to make choices in comparing bundles, in experimental work respondents may not demonstrate such an ability. This may be particularly true in the case of choices with which the respondent has no familiarity. Thus a respondent may be able to compare different bundles of food or clothing because

(a) these are familiar objects, and

(b) the outcome (or utility) of consuming various bundles is known.

However, in comparing different quantities of health care and environmental quality neither (a) nor (b) may be satisfied. Given sufficient information and time to understand these objects better, the respondent may be able to rank bundles, but the conditions and time required for such a study will not be met by a short survey. Consequently, the answers which are often obtained in survey work in preference analysis show not a smooth quadratic curve

but one which is highly idealized around some point (Shephard, Pomney, and Nerlove 1972) which more often than not is close to the current position of the respondent. Thus familarity breeds answers, and the less familiar the situation, the less able is the respondent to consider such alternatives.

The Expenditure Approach

As a result of these and other obstacles referred to above, the indifference curve approach was dropped. In its place was developed a technique which, while not providing trade-off criteria, still provides a means for measurement and aggregation, which will be described more fully in the next chapter.

This will be called the expenditure approach. Although it is referred to in this study as a third alternative, it is in fact a combination of both the direct and indirect approaches without the need for separate knowledge of prices and preferences. Such an approach thus looks at the solution of the demand equations:

$$X^* = X(P^*, Y^*)$$

without considering the underlying preference or price structure. As such it may be considered to suffer the disadvantages inherent in both these approaches, namely that prices are not known and that individuals are not able to consider the range of choice bundles put before them.

Moreover, an additional problem, one already referred to (Wallis and Friedman, 1942) is that there is a confounding of both price (or opportunity) and preference.

However, this last disadvantage may also be one of its strengths. By asking a less demanding question, namely how should a community spend its resources, one need not attempt to isolate these elements. Indeed, the confounding is in fact the solution to the optimization problem.

Yet by itself this does not overcome the problem raised in the context of the two approaches, namely a knowledge of prices and the ability to rank bundles. To a certain degree these problems may be overcome by the particular format used in this approach. Asking people how they would spend money is an approach with which people are more familiar than asking them to rank bundles.

Summary

Several problems in the selection, scaling and measurement of goals have been discussed. After considering two approaches to obtaining weights for goals, it was decided to develop an alternative approach based upon a combination of the direct and revealed preference approaches. The format of the questionnaire will be designed as an indirect approach to the Gigch-Dalkey procedure. Two criteria for testing whether this format succeeds in obtaining group (community) weights, without the need for iteration and feedback, will be

a comparison between an "individual" and a "community" set of responses, and a comparison of the variance of the responses to these two sets of questions.

CHAPTER 4.

THE SURVEY

Summary of the Problem

The problem to be dealt with is the measurement of certain tangible or less tangible goals which are held to be important measures of well-being or of the quality of life. The preceding chapters have discussed several difficulties in obtaining such information. These are:

1) The definition of a community and of community development.

2) The problem of obtaining individual weights which in turn becomes a problem of scaling and measurement. Two characteristics of scaling which also pose certain difficulties are

(a) the dimension of the scale

(b) the complexity of the scale.

3) The study is concerned with a community, and therefore is more interested in obtaining community rather than individual weights.

4) The range of goals to be measured and the need for consistency in the hierarchy of goals poses further problems.

5) The ability of individuals to make judgements and respond to questions concerning less tangible aspects of community life.

The Survey

In this section the survey questionnaire "A Study of Community Goals"--Appendix 5 of this study--is reviewed.

Development of the Survey

After examining several approaches to obtaining indifference curves (see chapter 3) it was realized that weights for the goals being studied could not be obtained, but that preferences for expenditure amongst these goals could be. Accordingly the survey was developed to ask respondents how they would allocate resources amongst these goals. The available scales and ways of measuring such choices were considered, and the method of paired comparisons, with a slight modification, was chosen, on the advice of Dr. L. Wolins of the Iowa State University Statistical Laboratory. This technique and other problems will be discussed subsequently. A description of the development of the survey, and of the pre-testing, is given in Appendix 5a.

Description of the Survey

The questionnaire is included as Appendix 5. The descriptive material developed to explain the nature and purpose of the survey is also included and only the outline and some additional information will be reviewed here.

The survey was administered in two towns, Pella(1) and West Union (2), both in Iowa. Within each town there are two

different questionnaires, known as community (1) and as individual (2). Within each questionnaire there are two levels of the questions, known as $1(1) and $10,000 (2).

Pages 1-12 of Appendix 5 are one complete community questionnaire. The differences between this and the individual questionnaire are to be found by comparing pages 12 and 13 which correspond to 3 and 5 of the community questionnaire.

Community "Now we want to discuss in what way the community should allocate its resources so that it would be of greatest benefit to most people."

Individual Now we want to discuss how you would allocate your community's resources.

This distinction is further emphasized in paragraph 3 on pages 3 and 12.

The wording used above was chosen so as to avoid problem (b) referred to in Appendix 5a which arose out of the pre-test information. In that questionnaire a simple adaptation of the projection technique (Mack & Myers, 1965) was used, by asking:

> "We would like you to answer by giving what you think are the community's preferences, not your own."

Both the purpose behind these two types of questions and the two levels of the questions will be discussed below in the subsection "Purpose of the Survey".

Another aspect, which will be discussed below in greater detail, is the use of the method of paired comparisons. The advantage of using this method lies in the simpler task the respondent has to perform. In this approach the respondent compares two goals--a 2-dimensional problem, whereas in other measuring scales all goals have to be ranked or sorted simultaneously, becoming an n-dimensional problem. A further advantage of this method is its unidimensionality: the weights attached to all the goals are along one scale.

Purpose of Survey

Two income levels By differentiating the indirect utility function, it can be seen that the solution depends on the level of income, Y. The $1 level was taken to represent an approximation to the current level of community expenditure i.e.:

$$(1)\ dU = \frac{\partial U^*}{\partial Q^*}\frac{\partial Q^*}{\partial P^*}dP^* + \frac{\partial U^*}{\partial Q^*}\frac{\partial Q^*}{\partial Y^*}dY^*$$

and assuming dY=0.

In the $10,000 case dY=$10,000, and the survey is designed to test for any income effect on the optimal level of expenditure.

Taxes versus resources The discussion of the pre-test survey noted the problem, familiar to the public finance literature, of the tendency for respondents to such questions to consider the tax burden. This questionnaire (see Appendix 5, p. 3) uses a broader definition of public resources:

> "...includes money spent by groups such as churches, local volunteer groups and the Chamber of Commerce as well as taxes collected by your community."

This approach should not be considered merely as an attempt to disguise the tax problem from the respondents, but more of a recognition of the full scope of resources devoted to such efforts as community development. Similar recognition to such non-market transfers at the national accounts level has been given by Boulding (1973) and in the specific context of the rural economy by Horvath (1974). An attempt was made to measure the extent of such transfers in the two sample towns, but was not completed due to inadequate data.

The definition of goals Goals are objectives whose attainment will lead to an increase in well-being or satisfaction. Such a definition can encompass both the more traditional and narrower approach based on utility theory, or the alternative and less restrictive choice theory (Little, 1957). Such goals possess value or weights, which may or may not vary with the level of goal attainment. However, goals per se exist independently of the level of satisfaction or attainment. At a saturation point the marginal value of such a goal is zero, yet the goal itself still exists.

There is thus a tendency in discussing goals to confuse these two aspects. It will help to clarify the distinction

by comparing goals with perceived needs. The latter are a function of both the current level of attainment and a target or saturation level of a set of goals.

A third term which also needs to be distinguished from goals is that of drives. A drive is defined as "the resultant of any sufficiently strong stimulus" (Roberts and Holdren, 1972). A goal may thus be a stimulus whose attainment produces a drive.

Selection of goals The goals selected had to meet the criteria of a common level, minimal duplication and be as broad as possible, as approximations to the desirable properties of mutual exclusion and mutual exhaustion for any classification scheme chosen. After reviewing the available literature on goals, such as the examples given in Appendix 1, after considering the problem of whether or not one could define a set of particularly rural goals, after considering the problems of beginning with an open-ended survey (Dalkey, 1972) it was decided to select the seven goals:

A) Increasing public safety.

B) Increasing the average family income.

C) Reducing income inequalities.

D) Increasing recreation and leisure facilities.

E) Increasing environmental quality.

F) Increasing health care.

G) Increasing public education.

One feature of this set is that the goals become goal activities or areas with specific meaning. It thus becomes possible for a respondent to translate an improvement in one of these areas into money units by conceiving of these goals as programs. The goals themselves were selected as representing the major areas or concerns of life--the economic, physical, physiological, communal or social, environmental, and the developmental or inspiring

In order to enable the respondents to understand these goals more fully, examples of various community activities were provided which would lead to an improvement of the goals suggested. Although many of the activities listed would likely have an impact on goals other than the one they appear with, their location in the table was chosen on the basis of their most significant role. Thus the format used is a quasi-utility tree (Strotz, 1957).

(2) $U=U(A,B,\ldots G)$

$A=A(X(1),X(2),X(6))$

$B=B(X(7),X(8),X(9))$

. .

. .

. .

$G=G(X(n-4),X(n-3),X(n-2),X(n))$.

In this format the respondent has to make some decision concerning the relative importance of the components of each goal. However, it is pointed out in the questionnaire that the activities should be taken as examples, and a respondent can either admit or reject any argument felt to be inappropriate.

Community versus individual goals In the latter case an individual's welfare function would be:

(3) $$U(j) = U(j)[\ A(j),B(j)...G(j)\ ]$$

and the community function would be some relationship

(4) $$W=W(U(1),U(2)...U(j)...U(n))$$

but in this study it is proposed that the concept of community goals is closer to an interdependent welfare function:

(5) $$U(j)=U(j)[U(1),U(2)...U(j-1),U(j)...U(n)\ ]$$

Hence by asking the respondent "how should...for the benefit of the community?" both the public finance problem and the problem of interpersonal weighting are solved. The latter is achieved by having the respondent make such interpersonal comparisons in answering the "community" questionnaire.

It can also be argued that if such a concept of community goals exists, it may be demonstrated by a greater degree of agreement in the responses to the 21 goal pairs given by the "community" than by the "individual" respondents. To test for this hypothesis analysis of the

variances or standard deviations for the two sets of responses can be compared. A second hypothesis, or an alternative to this one, is that there will be a greater tendency for convergence in the resurveying rounds in the case of the "community" respondents.

Socio-economic characteristics It is frequently argued, and tested, that responses to questions of the kind may be related to various socio-economic characteristics of the population being studied. Knowledge of such relationships may be useful for further analytical work and also for predictive purposes. The variables selected in this test were selected for their plausibility and convenience.

Design of Sample

Choice of Towns

The purpose of this study is to test the feasibility of measuring goals rather then to obtain a set of weights for the state of Iowa. Accordingly it was decided to select two representative towns which met certain criteria used in their selection.

1) the communities to be more rather than less self-contained.

2) the communities should be small but still within the size for which census data is available for comparison.

3) in addition to meeting the above criteria, one town should be more industrialized than the other, as well as

larger, in order to determine if this has any effect on the answers given.

1) Self-contained Communities. The principle characteristic of such a criterion was taken as the proportion of the available work force working within the community (a), compared to total employed residents (b). Such a simple ratio, a/b, by itself could not be used as a guide due to daily migration both to and from the community for work purposes. It is possible that a substantial portion of the work force commutes daily for work, but for the net effect to be zero due to an equally large number commuting into the town for work. Consequently, data on commuting patterns obtained by the Iowa State Highway Commission Origin and Destination Studies (Iowa State Highway Commission, Series) was used.

Origin and Destination Studies are comprehensive traffic counts for selected Iowa cities and towns. The information is collected by establishing surveyors at all entry points to the area under investigation. Interviews are conducted for eighteen hours per day. Automatic units record traffic during the remaining six hours. This information is adjusted according to standard formulae to provide 24-hour census material.

The information provided by such reports distinguishes between several types of flows.

(a) through traffic versus traffic originating or terminating in the survey area.

(b) purpose of trip.

(c) business dictrict versus other origin/destination trips.

(d) distance traveled/to be traveled.

(e) passenger density.

The two pieces of information used in this study are (d) and (b). The former provides a gravity model of traffic flows for up to 50 miles. Unfortunately, the Iowa Highway Commission is not interested in traffic flows across state borders. Consequently, border towns surveyed do not report the full traffic flows and had to be eliminated from the study. Those which remain for which full data was available and which, a priori, appeared to be self-contained due to the distance between that and any neighboring town, are listed in tables 1 and 2.

Table 1 shows traffic densities for 10-mile wide belts around each town for up to 50 miles. This data is then converted in table 2, using frequency midpoints, to an index of miles traveled which, when summed in line (1) provides an index of total distance traveled moving in both directions.

Information on purpose of trip is then used to obtain a figure, line (2), for work trips as a proportion of total trips. As with all data published in Studies, these figures

refer to both traffic into and out of the town. As the Highway Commission is only interested in the traffic density it does not distinguish between the two types of traffic. Hence work trips includes those commuters traveling to work in both directions.

The final figure used, line (3), is the product of (1) and (2), to give a "work-miles per total commuting" index. This figure is then used as a basis for comparing the degree of self-containment.

2) Census Data. Data published in the Census of Population 1970 provides information on selected socio-economic characteristics of the population. In order to use this data the towns selected would have to fall in the 2,500-10,000 size range, the smallest for which published information is available. Consequently Strawberry Point, Mapleton and Ida Grove, the three towns with the lowest indices, had to be eliminated due to this constraint.

3) Manufacturing and Size of Constraints. An index of the amount of industrialization of a town was developed by taking the proportion of employment in durable manufacturing to total employment. For the 84 towns in the census range of 2,500-10,000, the frequency distribution for this index is as follows:

Table 1. Frequency Distribution of Miles Travelled to and from 12 Iowa Communities

miles	A	B	C	D	E	F
0-10	59.93	71.28	70.25	62.19	66.40	49.86
10-20	22.45	13.61	14.80	23.33	17.19	31.21
20-30	8.81	10.14	6.70	10.02	11.94	11.46
30-40	2.52	1.39	1.03	2.90	1.50	3.09
40-50	6.29	3.58	7.22	1.56	2.97	4.38

Code		
	A	Guthrie Center
	B	Strawberry Point
	C	Mapleton
	D	Ida Grove
	E	West Union
	F	Harlan

G	H	I	J	K	L
62.08	44.79	32.66	56.63	65.94	48.65
9.64	38.20	42.80	28.84	23.50	28.65
19.04	9.87	18.69	3.55	3.06	16.4
2.21	4.46	2.74	3.34	5.12	2.44
7.03	2.68	3.11	7.64	2.38	3.86

Code G Chariton

H Atlantic

I Carroll

J Iowa Falls

K Pella

L Fairfield

Table 2. Miles Travelled to and from Work (1) and Average Work-Trip-Miles for 12 Iowa Communities (3)

miles	A	B	C	D	E	F
5	2.9965	3.5640	3.5125	3.1095	3.3200	2.4480
15	3.37	2.04	2.22	3.50	2.58	4.68
25	2.20	2.54	1.68	2.51	2.99	2.87
35	0.88	0.35	0.26	0.73	0.38	0.77
45	2.83	1.61	3.25	0.70	1.34	1.95
(1)	12.28	10.10	10.92	10.55	10.61	12.72
A work-trips	604	380	526	676	1031	857
B total trips	3800	2178	3308	3997	4762	5206
A/B = (2)	0.16	0.17	0.16	0.17	0.22	0.16
(3) = Product (1)(2)	1.96	1.72	1.75	1.79	2.33	2.04

G	H	I	J	K	L
3.1040	2.2395	1.6330	2.8315	3.297	2.43
1.45	5.73	6.42	4.33	3.53	4.29
4.76	2.47	4.67	0.89	0.77	4.10
0.55	1.12	0.69	0.84	1.28	0.85
3.16	1.21	1.40	3.44	1.07	1.73
13.02	12.77	14.81	12.33	9.95	13.4
1573	1747	1552	1548	1455	2555
7388	8935	8269	8198	6185	8190
0.21	0.20	0.19	0.19	0.24	0.31
2.73	2.55	2.81	2.34	2.39	4.15

Table 3. Frequency Distribution of Durable Goods Manufacturing Employment in Iowa Towns of 2,5000-10,000 People.

1st decile	18
2nd decile	18
3rd decile	15
4th decile	8
5th decile	8
6th decile	4
7th decile	7
8th decile	2
9th decile	1
10th decile	3

Of the nine towns remaining for consideration, Pella (17.1) lies in the 6th decile--14th from the top town, Le Claire, and West Union (1.4) lies in the 1st decile, 4th from the bottom. Moreover, West Union lies near to the 2,500 lower limit, and Pella close to the 10,000 limit, so that having satisfied the first two criteria they now must meet this third and final one, and were chosen as the units to study.

The Survey and Interviewing Procedure

The household sample was drawn by the Survey Section, Iowa State University Statistical Laboratory, using a stratified random sample procedure. Interviewers were provided with 2 reference points on each street appearing in any strata, with instructions to proceed inwards for a certain number of houses from each reference point, and to interview those houses remaining within those limits set by this procedure.

Prior to the survey a short training school was held for the interviewers. This covered the purpose and background of the survey, the procedure to be followed, an explanation of the material and a set of answers to questions which might be asked of them. Some of these questions were ones which had been raised in the earlier pre-test. Of the five interviewers who attended the schcol, only four continued to work on the survey, the fifth not giving any reason for withdrawing.

Two interviewers were sent to each town respectively. On completion on the West Union survey one interviewer was sent to Pella to raise the number to three. Interviews were mailed back to the Statistical Laboratory where they were checked, coded and punched out on card.

Although the returns from both towns appeared to be satisfactory, on examining the returns from Pella a

surprising feature became apparent, which gave some cause for concern. One would normally expect some consistency between the answers given to the $1 level and the $10,000 questions, but such consistency to be limited by conscious changes (e.g. for the income effect) and by error. It must be remembered that the respondents did not write down the answers given, nor were they allowed to see their original allocations on the $1 level questions. However, without the use of a control mechanism one cannot distinguish between these two types of change.

A casual check revealed on the surveys conducted by one of the Pella interviewers, a much higher level consistency in the answers to the two levels existed than on those conducted by the other three. A rough check showed only an average of four changes per sheet for the former compared to double that number for the latter. Another feature was that such changes as did occur tended to occur only towards the bottom end of the list of goal-pairs, i.e. in a non-random fashion.

There existed two possible interpretations of this situation. Either this one interviewer had, purely on a random basis, selected a unique group, or the interviews had not been conducted in a proper manner as laid down in the instructions to the surveyors. In order to determine the real cause, inquiries were made, by phone, of some of the respondents concerning the conduct of the interviews. With

the information obtained in this manner pointing to the latter hypothesis, sufficient cause for concern existed to warrant resurveying the fifty-five households in this group. Consequently, the data set obtained included the answers given by these 55 households to the second interviewer.

No satisfactory explanation of why this situation arose has yet been found, and as it does not seem likely that the final results obtained have been affected in any significant manner, the analysis was conducted on the modified data according to the initial design and purposes.

CHAPTER 5.

THE DATA SET

The Data

The complete data set used in this study is provided in Appendix 8. For ease of reference, the data has been sorted as follows:

1) for the 21 paired comparisons, for each town there are 2x2 tables, each one a specific money-preference combination

2) for certain selected socio-economic charateristics there is a one-way classification only, by town.

Variable Names and Code Sheet

The following code sheet provides both the coding used and abbreviated variable names used in the study. For example, the variable "years of education of the respondent" is referred to in the study as RESPED.

Treatment of Missing Variables

In the selected socio-economic characteristics, missing observations are coded as 8 or 88, and no response as a 9. In certain cases this produced a complication as 8 and 88 were used as a job classification and, potentially, for such responses as age respectively. Where this problem arose care was exercised to control for such variables on other unaffected data.

In the case of the paired comparisons, missing observations were left blank, as the potential range of responses was 0 - 100 in a 3-digit field, leaving no room for a specific code.

In analyzing both sets of data, only the population subsets formed by eliminating missing observations or no responses were used.

Coding

In most cases coding was performed by the interviewer, particularly where the response value was itself used as a code, such as years of education, age and years in the community. Income (see page 11, Appendix 5) was grouped into six ranges before the survey was conducted. It is considered easier for respondents to know the range within their income falls rather than the exact amount. Moreover, in not asking the exact amount there is a little inducement for respondents to deliberately distort their answers. For example, a desire to appear more affluent than current income shows the position to be might lead a respondent to bias the reported figure upwards. Unless the respondent jumps from one range to another in doing so, the response will not be affected by this tendency.

In the cases of occupation, WHYMOVE, and PRERES, coding was performed using the unstructured information in the questionnaire. The 10-occupation code corresponds to the

census codes with four exceptions:

(a) operatives and transportation operatives have been combined.

(b) laborers and farm laborers are combined.

(c) private household workers have been included in the services groups.

(d) the census has no "housewife" occupation.

In such cases as these three variables, a certain amount of discretion and judgement has to be exercised by the coder. Certain cases and examples are provided in the code sheet to illustrate this problem.

Census and Survey Comparisons

Where possible the same groupings were used for ease of comparison. Where this was not possible, it was found necessary to regroup either certain of the census or the survey data. In the case of income the census data was rearranged. It was assumed that the population was distributed uniformly within each income range and could be reallocated without doing an injustice to the overall distribution.

Code Sheet

Community Goals Code

Card 1

Col 1-3	Scheduled No. (Respondent).		
Col 4	Card No.	1-$1	
		2-$10,000	
5	Town	1-Pella	
		2-West Union	
6	Preferences	1-Community (white cover)	
		2-Individual (yellow cover)	
7	Sex	1-Male	
		2-Female	
8	Marital status	1-Single (divorced, separated, widowed, never married)	
		2-Married	
9	Respondent is	1-Head of household	
		2-Spouse of house	
10-72	Allocation of $1.00		
	Code 3 digit fixed	5¢ = 005	
		50¢ = 050	
		100¢ = 100	

Card 2

Col 16-72 Allocation of $10,000 = (21x3 columns)

$500 = 005

$5000 = 050

$10,000 = 100

Col 31-32 Size of household

(HHSIZE)

Col 33-34 Actual age of respondent

(RESPAGE)

35-36 Actual age of spouse, if any

88 = no spouse

(SPOUSAGE)

41-42 Code age of any other member of HH 18 or over

37-38 (FAMAGA)

39-40 (FAMAGB)

41-42 (FAMAGC) 88 no add. person

Col 43-44 Years of education of respondent

(RESPED)

45-56 Years of education of spouse, if any

88 = no spouse

(SPOUSED)

47-52 Ed. of 18+ members

47-48 (FAMEDA)

49-50 (FAMEDB)

51-52 (FAMEDC)

6 = 6 years or less

7-12 = Actual years

13-16 = Years in college

(16 = B.S. or B. A. Degree)

Ed. Code

18 = M.A. - optometrist

20 = Ph.D. or more - M.D.

88 = No add. members

Occupations (If respondent is retired from his/her primary job but is working part-time now, code the primary job and retired)

0 professional (teacher, nurse, accountant, college student, surveyor, engineer, writer, underwriter, personnel director, pharmacist, computer programmer, PR man)

1 Farmer, farm manager

2 manager, insurance & real estate holder, owner buyer, tech. field representatives, sales manager, self-employed (builds houses), self-employed construction, teller at savings and loan, hospital office manager, postmaster

3 Clerical - secretary, ward clerk in hospital, cashier, insurance adjuster, abstractor, bank teller

4 Sales - clerk, sales representative, car salesman, shop salesman - auto parts, shipping clerk, salesman

5 Craftsmen - traffic manager, factory foreman, self-employed carpenter, carpenter, electrician, foreman, painter, supervision, lays floor covering, maintenance, telephone man, road maintenance foreman, brick layer, paint tech.

6 Operative - truck driver, welder, butcher, delivery, lab technician, machine operator, assemblers, trimmer, appliance service, R. road agent, seamstress, drill press operative, parts man, egg candlers

7 Service - shoe repair, kitchen help in hosp., chief of police, policeman, waitress, beautician, barber, teacher's aid, lab tech in hospital, mail carrier, nurse's aid, bartender, cook, cake decorator - bakery

8 Laborers - construction, day work, mowing grass, farm work, office custodian

9 Housewife

Blank = unemployed or retired and no occupation given

Col 53 Occup. of respondent - as per code above (ROCCUP)

54 Is respondent retired? (RWORK)

0 - no

1-yes (also included semi-retired)

55 Occupation of spouse

(SPOCCUP)

56 Is spouse retired?

(SPWORK)

0 - no

1 - yes

57-59 Occup. of 18+ members

57 (FAMOCCA)

58 (FAMOCCB)

59 (FAMOCCC)

60-91 Years in community

(YRSCOMM)

(Code actual years. 01 = 1 year or less. if R says " all my life" code age given in table above)

62 (3a) previous place of residence

(PRERES)

1 - within 25 miles

2 - 25 to 75 miles

3 - within state

4 - out of state

5 - out of country

8 - always lived here

63 Why did ycu move here?

(WHYMOVE)

1 - to buy business - or farm

2 - respcndent cr spouse obtained employment here, financial reasons, to attend college, college here, ccllege graduate, college and work.

3 - Parents moved here

4 - Married - (spouse had job here)

5 - Lived here before, like this part of state, did not like big city, likes it here

6 - Illness of member of family, family and child lived here, retirement, closer to friends, husband died, family here

8 - always lived here

9 - no response

64 Household income

(INCOME)

1 - 0 - 2,999

2 - 3 - 6,999

3 - 7 - 12,999

4 - 13 - 19,999

5 - 20 - 29,999

6 - 30 - 99,999

9 - No Response

Pella and West Union: Some Population Comparisons

Pella, (Marion County), population 6668 (Census, 1970) is located approximately 50 miles east southeast of Des Moines. Founded by Dutch settlers it still boasts its heritage in many ways, particularly during its tulip festival time. It contains several manufacturing plants, and a four-year college.

West Union, (Fayette County), population 2624 (Census, 1970) is located in the northeast corner of Iowa, 40 miles west of the Mississippi. Unlike Pella, it is a county seat town, a fact which should be borne in mind when comparing the occupational distributions of the two towns.

Sources of Error

In the following tables several types of errors are likely to have affected the results obtained. These are

(1) sampling error;

(2) measurement error;

(3) related to (2), coding and data transformation errors;

(4) errors in variables, as for example, when a particular group is incorrectly aggregated with another group.

These four types of error will be referred to in the discussion which follows on some selected variables.

Variables Compared

RESPED There is a considerable difference between the reported census and survey data. Two factors need to be

considered. Firstly there is a five year lapse, and secondly the census population reports persons aged 25 and over. The former may make some slight difference, but the latter is likely to be more significant. Referring to Table 4 below, it can be seen that 28.5% of the Pella population is in the 20-29 age group. If, as can be argued on the basis of subsequent correlation analysis, the younger population is more educated, then some of the discrepancy can be accounted for in this manner. In further support of this, it should be noted that only 10.6% of West Union's population falls in the 20-29 age range, and the census means and medians for this town do not vary significantly.

It is also noticeable that there is a right skew in the West Union distribution. This could be accounted for by the fact that the town is a county seat and employs professional staff from a wider geographical area. However, Pella, while not being a county seat, is a college town, and in analyzing the variable ROCCUP one sees a higher group 0 frequency here than in West Union.

ROCCUP Although one would expect certain structural shifts in the occupational structure, it is hard to attribute the reported differences between the census and survey data to this alone. It is possible that an error in variables problem has arisen--particularly in the services group, as well as sampling error.

INCOME Both types (2) and (3) error are likely to have affected these results. The census data had to be transformed to correspond to the survey groupings. Consequently, a certain amount of error may have crept in here. This is the only variable which contains no responses, although the percentage of respondents unwilling to reveal their income is only 3%.

Allowing for these errors, one can attribute most of the rise in mean income of 57% for Pella and 46% for West Union to the rise in national GNP at current prices. Another fact which stands out is that the distribution of income has worsened in both towns. Taking the ratio of the median/mean incomes (as a measure of skewness), the ratio falls from 91.2 (Pella), 90.2 (West Union) to 80.5 (Pella), 71.5 (West Union).

In addition to the above variables several other variables were studied as shown in Table 5. For the classificatory variables, as with the previous ones, the simple frequency distribution was produced and analysed. In the case of RESPAGE and YRSCOMM groups were first of all constructed using RESPAGE = FLOOR (RESPAGE/ 10)*10 and YRSCOMM = FLOOR (YRSCOMM/5)*5, and the frequencies of these groups obtained.

No major differences between the two towns are evident. West Union has slightly larger family units, and the age

structure is also different. Pella's structure may be somewhat biased by the presence of a student population, although not all the difference can be accounted for by this as the percentages in the 0 - 4 YRSCOMM groups for the two towns do not vary by the same amount.

Table 4.
A Comparison of Certain Selected Survey and Census Variables for Pella and West Union

	Census				Survey			
	Number	%	Number	%	Number	%	Number	%
	Pella		West Union		Pella		West Union	
POPULATION	6668		3624		137		66	
(Population 25+)	(3444)		(1587)					
1-4	100	2.9	32	1.2	2	1.5	-	-
5-7	499	14.5	63	2.4	6	4.5	3	4.5
8	972	28.2	414	15.8	30	21.9	14	21.2
9-11	308	8.9	140	5.3	6	4.4	6	9.2
12	866	25.1	578	22.0	44	32.1	20	30.3
13-15	225	6.5	199	7.6	20	14.6	15	22.7
16-20	468	13.6	143	5.4	29	21.3	8	12.4
Median	10.4		12.2		12.6		12.5	
Mean	10.7		11.0		12.2		11.9	
ROCCUP:								
(Population)	(2926)		(1068)		(137)		(66)	
0 Professional	427	14.6	165	15.4	20	14.6	7	10.6
1 Farmers & Farm Managers	16	0.5	6.	0.6	5	3.7	4	6.1
2 Managers	187	6.4	105	9.8	13	9.5	10	15.2
3 Clerical	472	16.1	208	19.5	12	8.8	4	6.1
4 Sales	263	9.0	98	9.2	6	4.4	2	3.1
5 Craftsmen	340	11.6	142	13.3	16	11.7	6	9.1
6 Operatives*	544	18.6	91	8.5	13	9.5	2	3.3
7 Laborers**	143	4.9	81	7.6	13	9.5	5	7.6
8 Service Workers	534	18.3	172	16.1	5	3.7	2	3.3
9 Housewife	-		-		34	24.8	24	36.4

* Including transportation operatives.
** Including farm laborers.

Table 4 Continued.

		Census				Survey			
		Number	%	Number	%	Number	%	Number	%
		Pella		West Union		Pella		West Union	
INCOME:									
	(Population (Families))	(1629)		(635)		(137)		(66)	
A	0-2,999	175	10.7	87	12.7	14	10.2	6	9.1
B	3-6,999	451	27.7	184	26.9	20	14.6	16	24.2
C	7-12,999	614	37.7	253	36.9	41	29.9	23	34.8
D	13-19,999	263	16.1	99	14.5	33	24.1	11	16.7
E	20-29,999	93	5.7	57	8.3	18	13.1	4	6.1
F	30-99,999	33	2.0	5	0.7	6	4.4	4	6.1
G	No Response	-		-		5	3.7	2	3.0
	Median	8439		8303		11,682		9608	
	Mean	9258		9203		14,511		13,445	

Table 5.
A Comparison of Certain Selected Survey Variables
For Pella and West Union.

		Pella		West Union	
		number	%	number	%
(Total Pop)		(137)		(66)	
MARITAL	1	29	21.2	14	21.2
	2	108	78.8	52	78.8
SEX	1	65	47.4	27	40.9
	2	72	52.6	39	59.1
HHSIZE	1	20	14.6	14	21.2
	2	57	41.6	18	27.3
	3	18	13.1	11	16.7
	4	24	17.6	12	18.2
	5	13	9.5	5	7.6
	6-8	5	3.7	6	9.0
Median		2.9		3.1	
Mean		2.8		3.0	
WORK	0	112	81.8	52	78.8
	1	25	18.2	14	21.2
PRERES	0	51	37.2	16	24.2
	1	42	30.7	26	39.4
	2	9	6.6	6	9.1
	3	11	8.0	9	13.6
	4	24	17.5	7	10.6
	5	-	-	2	3.0
WHY MOVE	1	30	2.1	3	4.6
	2	50	36.5	25	37.9
	3	9	6.6	3	4.5
	4	6	4.4	5	7.6
	5	8	5.8	7	10.6
	6	10	7.3	7	10.6
	8	51	37.2	16	24.2

TABLE 5. CONTINUED.

		Pella		West Union	
		number	%	number	%
(Total Pop)		(137)		(66)	
RESPAGE	20-29	39	28.5	7	10.6
	30-39	19	13.9	10	15.2
	40-49	17	12.4	10	15.2
	50-59	24	17.5	10	15.2
	60-69	16	11.7	11	16.2
	70-79	13	9.5	11	16.7
	80-89	8	5.8	7	10.6
	90-100	1	0.7	-	-
Median		46.2		56.0	
Mean		47.6		55.5	
YRSCOMM	0-4	31	22.6	12	18.2
	5-9	10	7.3	8	12.1
	10-14	8	5.8	6	9.1
	15-19	7	5.1	11	16.7
	20-39	15	10.9	3	4.5
	40.59	29	21.0	10	15.1
	60-79	20	14.6	7	11.8
	80-89	15	10.8	9	13.5
	90-100	2	1.4	-	-
Median		28.3		21.4	
Mean		37.3		33.1	

CHAPTER 6.

TECHNIQUES OF ANALYSIS

The Method of Paired Comparisons

The description of the method of paired comparisons (MPC) given here follows Edwards (Edwards, 1957). Considerable assistance in understanding this technique and in applying it to this study was given by Dr. L. Wolins of the Iowa State University Statistical Laboratory.

The procedure used is based on Thurstone's Law of Comparative Judgement (Thurstone, 1927a, 1927b). Thurstone assumed that in any situation in which an individual is faced with making a response or judgement to some stimuli, "there is associated a most frequently aroused or modal discriminal process on a psychological continuum" (Edwards, 1957 p. 21). Three parameters associated with such a process (i) are bar S(i), the modal discriminal process which in the case of a normal distribution is also the mean of the process (or distribution) S(i), with discriminal dispersion (standard deviation) sigma (i).

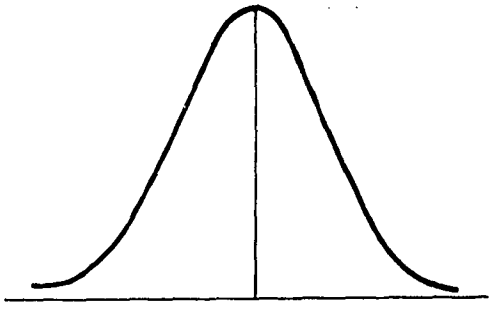

Figure 5a.

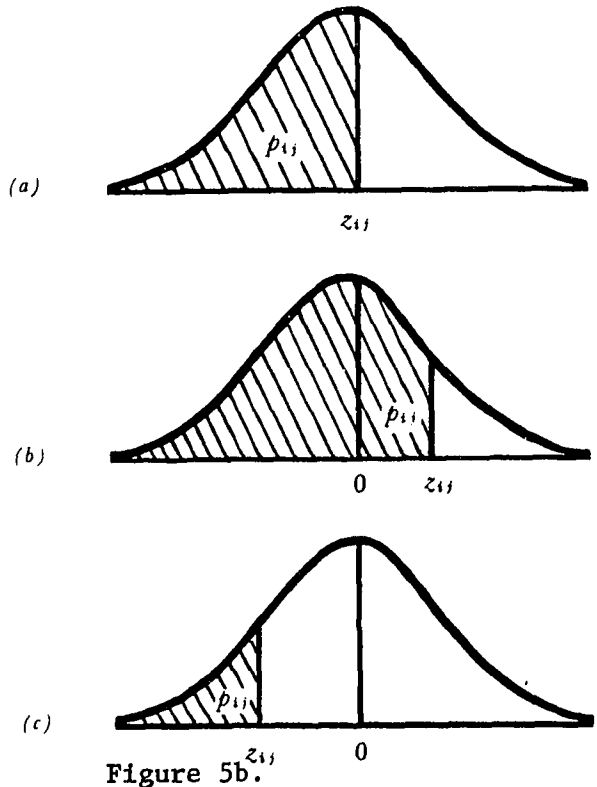

Figure 5b.

The unit normal deviate transformation for p_{ij}. When $p_{ij} = p_{ji}$ as in (*a*), then z_{ij} will correspond to the origin or zero point on the abscissa. When $p_{ij} > p_{ji}$ as in (*b*), then z_{ij} will fall to the right of the zero point on the abscissa and be positive in sign. When $p_{ij} < p_{ji}$ as in (*c*), then z_{ij} will fall to the left of the zero point on the abscissa and be negative in sign. Measurements on the abscissa are in units of one standard deviation.

Figure 5. The Modal Discriminal Process.
(Edwards 1957, Figures 2.1,2.2)

In the method of paired comparisons, two stimuli, i and j, both possessing the same attribute, are judged, and the responses bar S(i), sigma(i), bar S(j), sigma(j) are compared. In the usual application of this method, respondents are asked to make purely ordinal judgements, such as preference, size, weight or other attribute, and the frequency with which i is ranked greater than j is recorded:

$$f(ij) = i > j.$$

This value is then transformed by dividing by the total number of responses to obtain the proportion of responses judging i>j.

$$p(ij) = f(ij)/N$$

which in turn can be expressed as a unit normal deviate obtained from published tables, z(ij), where

$$z(ij) = \text{bar}S(i) - \text{bar}S(j).$$

In the case of two normally distributed variables it is known that:

1) $\sigma_i - \sigma_j = (\sigma_i^2 + \sigma_j^2 - 2r_{ij}\sigma_i\sigma_j)^{\frac{1}{2}}$

where r(ij) = correlation coefficient.

Thurstone expressed this as (Thurstone, 1927a):

2) $\bar{S}_i - \bar{S}_j = Z_{ij}(\sigma_i^2 + \sigma_j^2 - 2r_{ij}\sigma_i\sigma_j)^{\frac{1}{2}}$

or

3) $Z_{ij} = (\bar{S}_i - \bar{S}_j)/(\sigma_i^2 + \sigma_j^2 - 2r_{ij}\sigma_i\sigma_j)^{\frac{1}{2}}$

Unfortunately, without making further assumptions, such a system of equations would be underdetermined. In the

general case there would be

$$nC2=n(n-1)/2$$

which in the case of seven goals is 21 pairs, or equations, but with seven scale values (bar S(i)-barS(j)), seven standard deviations and twenty-one r(ij), a total of 35 unknowns. Thurstone overcame this problem by developing his case V, assuming

$$\text{Sigma(i)} = \text{Sigma(j)}$$

$$\text{r(ij)} = \text{r(for all i and j)}$$

which reduces (3) tc

(4) $Z_{ij} = (\bar{S}_i - \bar{S}_j)/(2\sigma^2(1-r))^{\frac{1}{2}}$

Further, by assuming the denominator to be constant, it can be given a value of 1, thus (4) reduces further to

(5) $Z_{ij} = \bar{S}_i - \bar{S}_j$

which permits the use of the Z(ij) tables to transform the P(ij) values as described above.

Three matrices which are used in the analysis will be called the F, P, and Z matrices. In the usual case involving ordinal data these three will contain the f(ij), p(ij), and z(ij) observations respectively. In the case of 7 goals the three matrices will have 7^2 dimensions, and 21 pairs being placed in upper or lower triangle of the F matrix.

In this study, using cardinal data, the f(ij) were taken as the SUM NX(ij) of the proportion of either $1 or $10,000 allocated to j. Although the allocation of these sums was

recorded for both i and j during the interviews, this was for convenience for both the respondent, who could make sure that the total summed up to the required amount, and the interviewer who could make a similar check. In practice only the one set is needed, as

$$p(ji) = 1/N\ f(ji)$$
$$= 1/N\ (N-f(ij))$$
$$= 1-p(ij)$$

and therefore

$$z(ij) = -z(ji).$$

The matrix P was obtained in similar fashion, where

$$P(ij) = NX(ij)/N(100)$$

The purpose of dividing through by 100 is to transform the responses given above to $1 equivalents. In the case of the $1 question the recorded answers were in cents. In the case of the $10,000 questions only the first three digits were coded and these were similarly divided by 100, so that both sets of data are on a common scale.

The data was punched directly onto card, and using an SAS sort routine was grouped 4 ways for each town, by type of preference and by level of money. Using a means procedure both the NX(ij) and NX(ij)/N values are printed. By dividing the latter by 100 the P matrix is obtained as shown in Tables 6 - 15.

Table 6.
Value of Total and Mean Responses, Pella.

Q=1 P=1	NX(ij) Nx100	NX(ij)	Q=1 P=2	NX(ij) Nx100	NX(ij)
AB	.9258	3050.0		.5679	3805.0
AC	.4139	2401.0		.3985	2670.0
AD	.6006	3484.0		.6358	4260.0
AE	.6137	3560.0		.5537	3710.0
AF	.3975	2306.6		.4522	3030.0
AG	.4784	2775.0		.4514	3025.0
BC	.5698	3305.0		.5365	3595.0
BD	.5155	2990.0		.5111	3425.0
BE	.3025	1755.0		.3679	2465.0
BF	.4801	2785.0		.4776	3200.0
BG	.3768	2186.0		.4231	2835.0
CD	.3956	2295.0		.4283	2870.0
CE	.6137	3560.0		.6082	4075.0
CF	.6750	3915.0		.6365	4265.0
CG	.4681	2715.0		.4865	3260.0
DE	.5017	2910.0		.5604	3755.0
DF	.5353	3105.0		.5388	3610.0
DG	.7118	4129.0		.6791	4550.0
EF	.4518	2621.0		.4977	3335.0
EG	.6060	3515.0		.5985	4010.0
FG	.5406	3136.0		.5253	3520.0

Explanation:

Q - 1 = $1
2 = $10,000
P - 1 = community
2 = individual

A = increasing public safety,
B = increasing the average family income,
C = reducing income inequalities,
D = increasing recreation and leisure facilities,
E = increasing environmental quality,
F = increasing health care,
G = increasing public education.

Table 6. Continued.

Q=2 P=2	NX(ij) Nx100	NX(ij)	Q=2 P=2	NX(ij) Nx100	NX(ij)
AB	.5083	2745.0		.5925	3970.0
AC	.4212	2275.0		.4380	2935.0
AD	.5935	3205.0		.6492	4350.0
AE	.5861	3165.0		.5462	3660.0
AF	.3879	2095.0		.4134	2770.0
AG	.4750	2565.0		.4634	3105.0
BC	.6194	3345.0		.5477	3670.0
BD	.4833	2610.0		.5045	3330.0
BE	.3388	1830.0		.3776	2530.0
BF	.4712	2545.0		.4410	2955.0
BG	.4149	2265.0		.4208	2820.0
CD	.4111	2220.0		.4149	2780.0
CE	.6490	3505.0		.5992	4015.0
CF	.6555	3540.0		.6597	4420.0
CG	.5074	2740.0		.4738	3175.0
DE	.5611	3030.0		.5514	3695.0
DF	.5250	2835.0		.5514	3695.0
DG	.7157	3865.0		.6843	4585.0
EF	.4990	2695.0		.5283	3540.0
EG	.6138	3315.0		.5940	3980.0
FG	.5611	3030.0		.5567	3730.0

Explanation:

Q - 1 = $1
2 = $10,000
P - 1 = community
2 = individual

A = increasing public safety,
B = increasing the average family income,
C = reducing income inequalities,
D = increasing recreation and leisure facilities,
E = increasing environmental quality,
F = increasing health care,
G = increasing public education.

Table 7.
Matrix of Mean Variables of Allocation of $1 to the Second Goal of Each Goal Pair, Untransformed (P) and Transformed (Z).

Q=1, P=1, Pella

P Matrix

	A	B	C	D	E	F	G
A	0	.526	.414	.601	.614	.398	.478
B		0	.570	.516	.303	.480	.377
C			0	.396	.614	.675	.468
D				0	.502	.535	.712
E					0	.452	.606
F						0	.541
G							0

Z Matrix

	A	B	C	D	E	F	G
A	0	.065	-.217	.256	.290	-.259	-.055
B	-.065	0	.176	.043	-.516	-.050	-.313
C	.217	-.176	0	-.264	.290	.454	-.080
D	-.256	-.043	.264	0	.005	.088	.559
E	-.290	.516	-.290	-.005	0	-.121	.269
F	.259	.050	-.454	-.088	.121	0	.103
G	.055	.313	.080	-.559	-.269	-.103	0

Sigma	-.08	.725	-.441	-.617	-.079	.009	.483
Sigma/7	-.011	.104	-.063	-.088	-.011	.001	.069
Sigma/7+.088	.077	.192	.025	0.0	.077	.087	.157
Rank	4	1	6	7	4	3	2

Explanation:

Q - 1 = $1
2 = $10,000
P - 1 = community
2 = individual

A = increasing public safety,
B = increasing the average family income,
C = reducing income inequalities,
D = increasing recreation and leisure facilities,
E = increasing environmental quality,
F = increasing health care,
G = increasing public education.

Table 8.
Matrix of Mean Variables of Allocation of $1 to the Second Goal of Each Goal Pair, Untransformed (P) and Transformed (Z).

Q=1, P=2, Pella

P Matrix

	A	B	C	D	E	F	G
A	0	.568	.399	.636	.554	.452	.451
B		0	.537	.511	.368	.478	.423
C			0	.560	.539	.679	E
				0	.498	.599	F
					0	.525	G
						0	

Z Matrix

	A	B	C	D	E	F	G
A	0	.171	-.256	.348	.136	-.121	-.123
B	-.171	0	.093	.028	-.337	-.055	-.194
C	.256	-.093	0	-.181	.274	.350	-.033
D	-.348	-.028	.181	0	.151	.098	.465
E	-.136	.337	-.274	-.151	0	-.005	.251
F	.121	.055	-.350	-.098	.005	0	.063
G	.123	.194	.033	-.465	-.251	-.063	0

Sigma	-.155	.636	-.573	-.510	-.022	.205	.429
Sigma/7	-.022	.091	-.082	-.073	-.003	.029	.061
Sigma/7+.082	.06	.173	0.0	.009	.079	.111	.143
Rank	5	1	7	6	4	3	2

Explanation:

Q - 1 = $1
2 = $10,000
P - 1 = community
2 = individual

A = increasing public safety,
B = increasing the average family income,
C = reducing income inequalities,
D = increasing recreation and leisure facilities,
E = increasing environmental quality,
F = increasing health care,
G = increasing public education.

Table 9.
Matrix of Mean Variables of Allocation of $1 to the Second Goal of Each Goal Pair, Untransformed (P) and Transformed (Z).

Q=2, P=1, Pella

P Matrix

	A	B	C	D	E	F	G
A	0	.508	.421	.594	.586	.388	.475
B		0	.619	.483	.339	.471	.419
C			0	.411	.649	.656	.507
D				0	.561	.525	.716
E					0	.499	.614
F						0.561	G
						0	

Z Matrix

	A	B	C	D	E	F	G
A	0	.020	-.199	.238	.217	-.285	-.063
B	-.020	0	.303	-.043	-.415	-.073	-.204
C	.199	-.303	0	-.225	.383	.402	.018
D	-.238	.043	.225	0	.154	.063	.571
E	-.217	.415	-.383	-.154	0	-.003	.290
F	.285	.073	-.402	-.063	.003	0	.154
G	.063	.204	-.018	-.571	-.290	-.154	0
Sigma	.072	.452	-.474	-.826	.052	-.050	.766
Sigma/7	.010	.065	-.068	-.118	.007	-.007	.109
Sigma/7+.118	.128	.183	.05	0.0	.125	.111	.227
Rank	3	2	6	7	4	5	1

Explanation:

Q - 1 = $1
2 = $10,000
P - 1 = community
2 = individual

A = increasing public safety,
B = increasing the average family income,
C = reducing income inequalities,
D = increasing recreation and leisure facilities,
E = increasing environmental quality,
F = increasing health care,
G = increasing public education.

Table 10.
Matrix of Mean Variables of Allocation of $1 to the Second Goal of Each Goal Pair, Untransformed (P) and Transformed (Z).

Q=2, P=2, Pella

P Matrix

	A	B	C	D	E	F	G
A	0	.593	.438	.649	.546	.413	.463
B		0	.548	.505	.378	.441	.421
C			0	.415	.599	.660	.474
D				0	.551	.551	.684
E					0	.528	.594
F						0	.557
G							0

Z Matrix

	A	B	C	D	E	F	G
A	0	.236	-.156	.383	.116	-.220	-.093
B	-.235	0	.121	.013	-.311	-.148	-.199
C	.156	-.121	0	-.215	.251	.412	.482
D	-.383	-.013	.215	0	.128	.128	.479
E	-.116	.311	-.251	-.128	0	.070	.238
F	.220	.148	-.412	-.128	-.070	0	.143
G	.093	.199	-.482	-.479	-.238	-.143	0

Sigma	-.265	.760	-.965	-.606	-.124	.099	1.016
Sigma/7	-.038	.109	-.138	-.087	-.018	.014	.145
Sigma/7+.138	.10	.247	0.0	.051	.12	.152	.283
Rank	5	2	7	6	4	3	1

Explanation:

Q - 1 = $1
2 = $10,000
P - 1 = community
2 = individual

A = increasing public safety,
B = increasing the average family income,
C = reducing income inequalities,
D = increasing recreation and leisure facilities,
E = increasing environmental quality,
F = increasing health care,
G = increasing public education.

Table 11.
Value of Total and Mean Responses, West Union.

Q=1 P=1	NX(ij) Nx100	NX(ij)	Q=1 P=2	NX(ij) Nx100	NX(ij)
AB	.4954	1635.0		.4984	1595.0
AC	.4196	1385.0		.4421	1415.0
AD	.5196	1715.0		.5687	1820.0
AE	.6181	2040.0		.5687	1680.0
AF	.4272	1410.0		.3968	1270.0
AG	.3136	1035.0		.4546	1455.0
BC	.5140	1645.0		.5562	1780.0
BD	.3606	1190.0		.3625	1160.0
BE	.2984	985.0		.3265	1045.0
BF	.4969	1640.0		.4718	1510.0
BG	.3863	1275.0		.3406	1090.0
CD	.3439	1135.0		.3734	1195.0
CE	.5848	1930.0		.6125	1960.0
CF	.5924	1955.0		.6234	1995.0
CG	.3969	1310.0		.3796	1215.0
DE	.4378	1445.0		.4765	1525.0
DF	.4242	1400.0		.4812	1540.0
DG	.6439	2125.0		.6562	2100.0
EF	.3772	1245.0		.4375	1400.0
EG	.4818	1590.0		.5140	1645.0
FG	.5363	1770.0		.5468	1750.0

Explanation:

Q - 1 = $1
2 = $10,000
P - 1 = community
2 = individual

A = increasing public safety,
B = increasing the average family income,
C = reducing income inequalities,
D = increasing recreation and leisure facilities,
E = increasing environmental quality,
F = increasing health care,
G = increasing public education.

Table 11. Continued.

Q=2 P=2	NX(ij) Nx100	NX(ij)	Q=2 P=2	NX(ij) Nx100	NX(ij)
AB	.4500	1485.0		.5218	1670.0
AC	.4166	1375.0		.4609	1475.0
AD	.5513	1820.0		.6187	1980.0
AE	.6015	1985.0		.5553	1777.0
AF	.4378	1445.0		.4281	1370.0
AG	.3727	1230.0		.4390	1405.0
BC	.5287	1745.0		.5203	1665.0
BD	.4378	1445.0		.4068	1302.0
BE	.3787	1250.0		.3250	1040.0
BF	.5121	1690.0		.4859	1555.0
BG	.4575	1510.0		.3890	1245.0
CD	.3984	1315.0		.3437	1100.0
CE	.5803	1915.0		.5756	1842.0
CF	.5545	1830.0		.6140	1965.0
CG	.4530	1495.0		.4375	1400.0
DE	.4924	1625.0		.4625	1480.0
DF	.4969	1640.0		.4769	1535.0
DG	.6136	2025.0		.6687	2140.0
EF	.4015	1325.0		.4546	1455.0
EG	.5500	1815.0		.5328	1705.0
FG	.5636	1860.0		.5734	1835.0

Explanation:

Q - 1 = $1
2 = $10,000
P - 1 = community
2 = individual

A = increasing public safety,
B = increasing the average family income,
C = reducing income inequalities,
D = increasing recreation and leisure facilities,
E = increasing environmental quality,
F = increasing health care,
G = increasing public education.

Table 12.
Matrix of Mean Values of Allocation of $10,000 to the Second Goal of Each Goal Pair, Untransformed (P) and Transformed (Z).

Q=1, P=1, West Union

P Matrix

	A	B	C	D	E	F	G
A	0	.495	.419	.519	.618	.427	.313
B		0	.514	.360	.298	.496	.386
C			0	.343	.564	.592	.396
D				0	.437	.424	.643
E					0	.377	.481
F						0	.536
G							0

Z Matrix

	A	B	C	D	E	F	G
A	0	-.013	-.204	.048	.300	-.184	-.487
B	.013	0	.035	-.358	-.530	-.010	-.290
C	.204	-.035	0	-.404	.212	.233	-.264
D	-.048	.358	.404	0	-.159	-.192	.366
E	-.300	.530	-.212	.159	0	-.313	-.048
F	.184	.010	-.233	.192	.313	0	.093
G	.478	.290	.264	-.366	.048	-.093	0

Sigma	.540	1.14	.054	-.729	.184	-.559	-.639
Sigma/7	.077	0.16	.007	-.104	.026	-.079	-.091
Sigma/7+.104	.181	.264	.111	0.0	.130	0.02	.013
Rank	2	1	4	7	3	5	6

Explanation:

Q - 1 = $1
2 = $10,000
P - 1 = community
2 = individual

A = increasing public safety,
B = increasing the average family income,
C = reducing income inequalities,
D = increasing recreation and leisure facilities,
E = increasing environmental quality,
F = increasing health care,
G = increasing public education.

Table 13.
Matrix of Mean Values of Allocation of $10,000 to the Second Goal of Each Goal Pair, Untransformed (P) and Transformed (Z).

Q=1, P=2, West Union

P Matrix

	A	B	C	D	E	F	G
A	0	.498	.442	.569	.525	.397	.455
B		0	.556	.363	.327	.471	.341
C			0	.373	.613	.623	.380
D				0	.477	.481	.656
E					0	.438	.514
F						0	.547
G							0

Z Matrix

	A	B	C	D	E	F	G
A	0	-.005	-.146	.171	.063	-.264	-.116
B	.005	0	.141	.353	-.451	-.073	-.412
C	.146	-.141	0	-.324	.285	.313	-.308
D	-.171	.353	.324	0	-.060	-.048	.402
E	-.063	.451	0.285	.060	0	-.159	.035
F	.264	.073	-.313	.048	.159	0	.116
G	.116	.412	.308	-.402	-.035	-.116	0

Sigma	.297	1.143	.029	-.80	-.039	-.347	-.283
Sigma/7	.042	.016	.004	-.114	.005	-.049	-.040
Sigma/7+.114	.156	.130	.118	0.0	.114	.065	.074
Rank	1	2	3	7	4	6	5

Explanation:

Q - 1 = $1
2 = $10,000
P - 1 = community
2 = individual

A = increasing public safety,
B = increasing the average family income,
C = reducing income inequalities,
D = increasing recreation and leisure facilities,
E = increasing environmental quality,
F = increasing health care,
G = increasing public education.

Table 14.
Matrix of Mean Values of Allocation of $10,000 to the Second Goal of Each Goal Pair, Untransformed (P) and Transformed (Z).

Q=2, P=1, West Union

P Matrix

	A	B	C	D	E	F	G
A	0	.450	.417	.551	.601	.438	.373
B		0	.529	.438	.379	.512	.458
C			0	.398	.580	.555	.453
D				0	.492	.497	.614
E					0	.402	.550
F						0	.564
G							0

Z Matrix

	A	B	C	D	E	F	G
A	0	-.126	-.212	.128	.256	-.159	-.327
B	.126	0	.070	-.159	-.311	.030	-.108
C	.212	-.070	0	-.259	.202	.136	-.118
D	-.128	.159	.259	0	-.020	-.010	.287
E	-.256	.311	-.202	.020	0	-.251	.126
F	.159	-.030	-.136	.010	.251	0	.159
G	.327	.108	.118	-.289	-.126	-.159	0

Sigma	.440	.352	-.103	-.547	.252	-.413	.019
Sigma/7	.063	.050	-.015	-.078	.036	-.059	.003
Sigma/7+.078	.141	.128	.063	0.0	.114	.019	.081
Rank	1	2	5	7	3	6	4

Explanation:

Q - 1 = $1
2 = $10,000
P - 1 = community
2 = individual

A = increasing public safety,
B = increasing the average family income,
C = reducing income inequalities,
D = increasing recreation and leisure facilities,
E = increasing environmental quality,
F = increasing health care,
G = increasing public education.

Table 15.
Matrix of Mean Values of Allocation of $10,000 to the Second Goal of Each Goal Pair, Untransformed (P) and Transformed (Z).

Q=2, P=2, West Union

P Matrix

	A	B	C	D	E	F	G
A	0	.522	.461	.619	.555	.428	.439
B		0	.520	.407	.325	.486	.389
C			0	.344	.576	.614	.438
D				0	.463	.480	.669
E					0	.455	.533
F						0	.573
G							0

Z Matrix

	A	B	C	D	E	F	G
A	0	.055	-.100	.300	.138	-.181	-.154
B	-.055	0	.050	-.238	-.454	-.038	-.282
C	.100	-.050	0	-.404	.189	.292	-.159
D	-.300	.238	.404	C	-.095	-.053	.434
E	-.138	.454	-.189	.095	0	-.116	.080
F	.181	.038	-.292	.053	.116	0	.184
G	.154	.282	.159	-.434	-.080	-.184	0

Sigma	-.058	1.017	.032	-.628	-.186	-.280	.109
Sigma/7	-.008	.145	.005	-.089	-.027	-.040	.015
Sigma/7+.089	.081	.234	.094	0.0	.062	.049	.140
Rank	4	1	3	7	5	6	2

Explanation:

Q - 1 = $1
2 = $10,000
P - 1 = community
2 = individual

A = increasing public safety,
B = increasing the average family income,
C = reducing income inequalities,
D = increasing recreation and leisure facilities,
E = increasing environmental quality,
F = increasing health care,
G = increasing public education.

The Significance of Ranks

The results obtained from the ranking procedure are set out below, Table 16. For convenience the raw figure is adjusted by adding the absolute value of the response with the largest negative value to the other 6 responses in each set.

Table 16.
Mean Weights for 7 Community Goals.

	West Union				Pella			
	Q=1 P=1	Q=1 P=2	Q=2 P=1	Q=2 P=2	Q=1 P=1	Q=1 P=2	Q=2 P=1	Q=2 P=2
A	.181	.156	.141	.081	.077	.060	.128	.100
B	.264	.130	.128	.234	.192	.173	.183	.247
C	.111	.118	.063	.094	.025	.000	.050	.000
D	.000	.000	.000	.000	.000	.009	.000	.051
E	.130	.114	.114	.062	.077	.079	.125	.120
F	.020	.065	.019	.049	.087	.111	.111	.152
G	.013	.074	.081	.140	.157	.143	.227	.283

Table 17.
Ranks for 7 Community Goals.

	West Union				Pella			
	Q=1 P=1	Q=1 P=2	Q=2 P=1	Q=2 P=2	Q=1 P=1	Q=1 P=2	Q=2 P=1	Q=2 P=2
A	2	1	1	4	4	5	8	5
B	1	2	2	1	1	1	2	2
C	4	3	5	3	6	7	6	7
D	7	7	7	7	7	6	7	6
E	3	4	3	5	4	4	4	4
F	5	6	6	6	3	3	5	3
G	6	5	4	2	2	2	1	1

Using the SAS program a test for differences in the above rankings was made using Spearman's statistic Rho, defined as

$$1 - \frac{6 \text{ Sigma(i from 1 to n)}[R(X(i)) - R(Y(i))]^2}{n\,(n^2 - 1)}$$

where (X(i), Y(i)) is treated as a bivariate random variable and R(X(i)), R(Y(i)) as the ranking (Conover, 1971).

Using tabulated values, Spearman's Rho can be used for testing both one- and two-tailed hypotheses for independence. Under the two-tailed test, the hypotheses are

(1) H(0): X(i), Y(i) are mutually independent.

(2) H(1): either positive or negative correlation exists.

Using the distribution of Rho, one can test for the degree to which the survey has detected significantly different responses in the two parts of the questionnaire, the

(1) community-individual test.

(2) $1 - $10,000 test

and also the degree to which responses of the two towns differ. If such differences have been detected this would be detected by failure to reject the H(0). The complete Rho matrix is set out in Table 18.

Table 18.
Spearman's Rho for Goal Ranks for all Effects.

COMMLOWWU	INDLOWWU	COMMHIWU	INDHIWU	COMMLOWWP	INDLOWWP	COMMHIWP	INDHIWP
1.00	0.89	0.86	0.53	0.41	0.38	0.42	0.10
(.00)	(.00)	(.01)	(.21)	(.35)	(.53)	(.33)	(.31)
0.89	1.00	0.89	0.64	0.27	0.07	0.46	-0.03
(.00)	(.00)	(.00)	(.11)	(.56)	(.87)	(.29)	(.93)
0.85	0.89	1.00	0.60	0.46	0.35	0.71	0.28
(.01)	(.00)	(.00)	(.14)	(.28)	(.56)	(.07)	(.53)
0.53	0.64	0.60	1.00	0.66	0.50	0.75	0.46
(.21)	(.11)	(.14)	(.00)	(.10)	(.25)	(.05)	(.29)
0.41	0.27	0.46	0.66	1.00	0.95	0.84	0.91
(.35)	(.56)	.28)	(.10)	(.00)	(.00)	(.01)	(.00)
0.28	0.07	0.35	0.50	0.95	1.00	0.78	0.96
(.53)	(.37)	(.56)	(.25)	(.00)	(.00)	(.03)	(.00)
0.42	0.46	0.71	0.75	0.84	0.78	1.00	0.82
(.33)	(.29)	(.07)	(.05)	(.01)	(.03)	(.00)	(.02)
0.10	-0.03	0.28	0.46	0.91	0.96	0.82	1.00
(.31)	(.93)	(.53)	(.29)	(.00)	(.00)	(.02)	(.00)

Case 1 Preference Effect: Community-Individual: In 3 of the 4 pairs a highly significant level of correlation exists and H(0) is rejected.

West Union	COMMLOW-INDLOW	.89
		(.008)
	COMMHI-INDHI	.61
		(.147)
Pella	COMMLOW-INDLOW	.95
		(.001)
	COMMHI-INDHI	.82
		(.024)

Case 2 Money Effect: $1 - $10,000: In 3 of the 4 pairs H(0) is also rejected.

West Union	COMMLOW-COMMHI	.86
		(.014)
	INDLOW-INDHI	.64
		(.118)
Pella	COMMLOW-COMMHI	.84
		(.017)
	INDLOW-INDHI	.46
		(.001)

In both of the above cases H(0) is rejected. This could be due to

1) the respondents holding a very idealized views which are invariant to such changes,

2) failure of the questionnaire to adequately detect such shifts in responses as would occur if H(0) had not been rejected. The latter case is a type 1 error.

Case 3 Town Effect: Pella - West Union: In 3 out of 4 cases H(0) is not rejected: significantly different rankings of the 7 goals exist between the two towns for 3 of the 4. The fourth is significant at the 7% level.

West Union	Pella		
COMMLOW	COMMLOW	.41	
			(.357)
INDLOW	INDLOW	.07	
			(.873)
COMMHI	COMMHI	.71	
			(.07)
INDHI	INDHI	.46	
			(.294)

The fact that such differences between the two towns were detected would seem to indicate that the questionnaire can elicit meaningful responses, in so far as these two populations are concerned, although this does not determine whether the case 1 and 2 failures are examples of Type 1 error or not.

Significance of Results in Method of Paired Comparisons

Distribution of Paired Responses

Previous information on the means of the responses was reported without comment. At this point such comment becomes appropriate when taken together with certain other characteristics of the study, namely

(1) the median responses.

(2) the range of goal weights.

The Range of Goal Weights

One factor to consider is the degree to which the goal weights are separated on the scale used. Again, two possibilities exist in interpreting the results. Either there is a limited range of weights per se, or the test fails to discern whether or not a greater degree of discrimination is held by the respondents. Thus it can be noted that the modal response is quite frequently somewhat close to the theoretical mean, and as a result the final scales obtained cover a narrow range of the possible total scale. Such a situation could be explained by a type of fiscal conservatism on the part of the respondents, a tendency to play safe by avoiding extreme allocations. During the pre-test interview one respondent told the interviwer that she always believed in being fair, so she could divide the money equally between all goal pairs.

Given such a tendency, the final scales obtained are strongly influenced by outliers who affect the mean. Without their presence it is possible that the final rankings would be based on a scale which was determined by the second or third decimal point.

Median Responses and the Mean

The frequency distributions of the transformed responses to the 21 paired comparisons were computed (Appendix 7).

Except in the case of DG for West Union, and AD, CF, and DG for Pella, there is a left-skew in the distribution of the responses. There is a tendency for the median response to lie around 2.33 or less, and the mean to be higher, such that the distribution begins to approximate a CHISQ curve. As a result, the curve for the responses to the goals on the left side of each pair takes on the opposite appearance, with a right skew. This raises the question of whether such a pattern is strictly due to the preference pattern of the population, or whether it is due to some quirk in the way in which the responses were obtained.

One possibility which arises in the interview-response situation is that the respondent considers the pair of goals, is more influenced by the first one of the two and gives that one a higher weight. The order in which the goals are presented is as follows:

	1st	2nd
A	6	0
B	5	1
C	4	2
D	3	3
E	2	4
F	1	5
G	0	6

so that goals A, B, C, appear first 15 times, E, F, G, appear second 15 times, and goal D appears first and second three times. Yet despite this equal distribution of the order of the pairs out of the total 42 pairs presents to the respondents, in 38 of these cases the second goal has a lower median value than the first goal.

Three tests for determining whether or not such a tendency occurs could be conducted. One, which cannot be done at this stage, would be to randomly distribute the order of the pairs and conduct an ANOVA test to detect the significance of the ordering. A second, less rigorous test, is to examine the final goal rankings. The order of presentation moves from left to right as one moves from A to G. If the goal rankings were also ordered A to G in decreasing order of importance then some grounds for concern might exist. In examining the

results from Pella and West Union no such pattern emerges, so that on the surface at least this does not appear to be a problem.

A third test for such a tendency is the additivity or error test, which is basically a test for intransitivity. Although this test is a general test for error and not for any particular cause of it, it might be possible to argue that one of its causes is this phenomenon. Moreover, should both the error test prove significant and the goal ranking follow the above ordering pattern then grounds for substantial concern with this problem would exist.

The Error Test

Underlying the work being conducted in this study is the assumption that respondents are able to order pairs in a rational manner. In the language of collective choice this assumes either transitivity, a condition on triples, or the weaker condition of acyclicity which holds for the entire set.

In order to test whether or not respondents had answered the 21 paired goals in a consistent manner, a more general test for additivity was performed. The test procedure was devised by Dr. L. Wolins, and computational work conducted by Ken Pinsky, both of the Iowa State statistical Laboratory.

In the method of paired comparisons the model

$$Y(IJ) = bX(I)+e(IJ)$$

X = a classification matrix

I = 1...7

J = 1...n

is used to determine the influence of stimulus i on respondent j. By rewriting the model as the difference between two stimuli:

$$Y(IJ)-Y(IJ)' = bX(I)-bX(I)'$$

the classification matrix takes on a different form but still provides the same answers. Thus, in the procedure used above to obtain a scale, the transformed values for each response, entered into a P matrix were averaged. To take a section of this difference equation to illustrate its application, the following classification matrix for 4 stimuli is given:

	A	B	C	D
Y(AB)	1	-1		
Y(AC)	1		-1	
Y(AD)	1			-1
Y(BC)		1	-1	
Y(BD)		1		-1
Y(CD)			1	-1

By taking the product of X'Y one obtains:

AB+AC+AD.

-AB+BC+BD.

-AC-BC+CD.

-AD-BD-CD.

which is exactly the same as adding down the columns of the P matrix, with the negative signs indicating that some of the elements are on one side of the diagonal of the skew symmetric matrix, and the positive signs on the other side.

Using a regression treatment of the one-way classification analysis of variance, one can obtain the sum of squares due to regression and the mean square error respectively,

(a) bX'Y/d.f. (M.S.R)

(b) Y'Y-bX'Y/d.f.(M.S.E.)

for each respondent for the 7 stimuli. Moreover, (S.S.R./M.S.E.) is approximately distributed as F, under the null hypothesis of additivity.

(c) F(6,14) = Sigma(I=1...7)(M.S.R.(I)/M.S.E.(I)).

The test results The test was preformed using the following matrix and the responses obtained to the twenty-one goal pairs.

	A	B	C	D	E	F	G
AB	1	-1					
AC	1		-1				
AD	1			-1			
AE	1				-1		
AF	1					-1	
AG	1						-1
BC		1	-1				
BD		1		-1			
BE		1			-1		
BF		1				-1	
BG		1					-1
CD			1	-1			
CE			1		-1		
CF			1			-1	
CG			1				-1
DE				1	-1		
DF				1		-1	
DG				1			-1
EF					1	-1	
EG					1		-1
FG						1	-1

Fig 6. Classification Matrix for 21 Goal Pairs.

Because the respondents replied to two sets of questions, the F value for both responses were taken to reject or accept the null hypothesis. Thus, if a respondent had an insignificant F value on one set, but a significant one on the other, it was decided to reject H(0).

Only 15 respondents were rejected using this test, out of approximately 200. It would thus appear that the respondents had made a conscious effort in answering the questionnaire, and had not been influenced by the order in which the questions were put.

Another interesting result was obtained by comparing the F values for the $1 compared to the $10,000 questions. In some cases the former were greater than the latter. In other cases the position was reversed. Taking an arbitrary levl of 2:1, approximately 30 people fell in the former category, and 40 in the latter. This would indicate that some learning took place for this latter group, the respondents feeling surer of their responses on the second round, whereas for a slightly smaller group the opposite is true.

The Multivariate Analysis of Variance Test (MANOVA)

In the one-way fixed variable analysis of variance model (ANOVA), the model

(1) $X(ij)=u+a(j)+e(ij)$ $\quad i = 1...n1(a)$

$X=NID(mean,variance)$ $\quad j = 1...k$

is used to test the hypothesis

(2) $H(0):alpha(1)=alpha(2)=...alpha(k)$

In vector notation, and by reparameterizing $u = u + alpha(j)$.

(3) $x=Au+e$

Any hypothesis matrix, C, can be used under the hypothesis

(4) $H(0):Cu=0$

which is distributed as F with degrees of freedom g, N-r, and (4) is accepted if $F < F(a;g, N-r)$. (Morrison, 1967.)

In the one-way MANOVA model P response variates are recorded at each of K treatment levels. Equation (3) now becomes:

(5) $X(i)=Au(i)+e(i)$ $\quad i=1...k$

(5a) $X(i)=NID(mean(i),SIGMA)$.

where SIGMA is the unknown covariance matrix (Press, 1972).

Under the assumption of homoscedasticity the null hypothesis is that

$H(0): u(1) = u(2) = ... u(k)$

$H(1): u(1) \neq u(2) \neq ... u(k)$

which is computed by comparing the determinants of the

respective SIGMA matrices. Various algorithms for testing H(o) have been developed, referred to by Press and Morrison. In addition to these, certain approximations to the F distribution also exist, which are tabulated as in the univariate case.

A MANOVA Test for Survey Effects

An alternative method for testing the significance of the three tests in the survey--town, money, and preference--was developed using a MANOVA routine available in SAS. In this study the model now has the following dimensions

X(1)=Au(i)+E(i)

X=21x1
A=21x22

X(2)=Au(2)+E(i)

U=22x1
E=21x1

where the number of observations in each X(i) depends on which test is being conducted, given the different sample sizes between Pella and West Union.

The test is performed by taking the appropriate two data sets for each test, leaving the two treatment values, 1,2, of the classification variable whose effect is being studied. The full range of these tests is contained in Table 19.

Table 19.
MANOVA Test of Effect.

	Effect	Town	Comparison	F Value	D.F.	Alpha[1]
1)	Preference	Pella	COMMLOW-INDLOW	0.548	21,11	0.94
		Pella	COMMHI-INDHI	0.648	21,11	0.87
		West Union	COMMLOW-INDLOW	1.013	21,14	0.469
		West Union	COMMHI-INDHI	0.464	21,44	0.970
2)	Money	Pella	COMMLOW-INDHI	.762	21,11	0.758
		Pella	INDLOW-INDHI	.419	21,11	0.987
		West Union	COMMLOW-COMMHI	.918	21,44	0.571
		West Union	COMMLOW-COMMHI	.671	21,44	0.837
3)	Town*	West Union-Pella	COMMLOW-COMMLOW	1.1402	21,79	0.363
		West Union-Pella	INDLOW-INDLOW	1.653	21,80	0.057
		West Union-Pella	COMMHI-COMMHI	1.160	21,79	0.309
		West Union-Pella	INDHI-INDHI	1.871	21,80	0.024

[1] Alpha level = Significance level.

Analysis of MANOVA Test

In neither the test for preferences or for money is any significant effect obtained. In both cases the null hypothesis of no differences is not rejected. Although this is the opposite test of the null hypothesis underlying the Spearman Rho test, both the MANOVA and Rho test provide the same conclusion of no significance.

In the case of the test for the town effect, two of the four tests are statistically significant and two are not, yet even these latter two have a much higher F value than any of the previous 8 tests. These results, partly rejecting the null hypothesis of no differences, provide additional evidence of support for the results of the Spearman Rho test for this hypothesis.

The Variance of Responses

In an attempt to develop criteria for whether or not there exists such a concept as community goals, it was argued above that evidence to support this belief might be obtained by looking at the degree of agreement/disagreement which is found in the responses obtained to the 21 pairs. To test this hypothesis the transformed responses sorted according to question, town, sex, and preference, i.e., 2^4 ways, providing 2^3 comparisons for a preference effect. The data used for this test is provided in Table 20.

Table 20.
Mean and Standard Deviations of Responses To 21 Goal Pairs.

Variable	N	A Mean	SD	Variable	N	C Mean	SD
AB	33	0.256	0.093	AB	32	0.250	0.117
AC	33	0.206	0.126	AC	32	0.198	0.104
AD	33	0.261	0.117	AD	32	0.242	0.094
AE	33	0.291	0.097	AE	32	0.257	0.116
AF	33	0.221	0.131	AF	32	0.258	0.139
AG	33	0.216	0.126	AG	32	0.218	0.113
BC	33	0.258	0.104	BC	32	0.226	0.143
BD	33	0.236	0.131	BD	32	0.228	0.125
BE	33	0.161	0.097	BE	32	0.183	0.119
BF	33	.219	0.122	BF	32	0.244	0.133
BG	33	0.199	0.116	BG	32	0.221	0.131
CD	33	0.182	0.119	CD	32	0.221	0.127
CE	33	0.290	0.117	CE	32	0.275	0.068
CF	33	0.300	0.099	CF	32	0.273	0.094
CG	33	0.234	0.116	CG	32	0.230	0.090
DE	33	0.206	0.103	DE	32	0.251	0.079
DF	33	0.240	0.108	DF	32	0.231	0.076
DG	33	0.292	0.109	DG	32	0.303	0.106
EF	33	0.221	0.115	EF	32	0.237	0.085
EG	33	0.272	0.096	EG	32	0.260	0.060
FG	33	0.256	0.126	FG	32	0.237	0.083

		B				D	
AB	35	0.224	0.067	AB	37	0.259	0.073
AC	35	0.203	0.072	AC	37	0.190	0.102
AD	35	0.268	0.105	AD	37	0.308	0.080
AE	35	0.251	0.050	AE	37	0.248	0.078
AF	35	0.181	0.083	AF	37	0.180	0.084
AG	35	0.236	0.064	AG	37	0.214	0.064
BC	35	0.263	0.090	BC	37	0.258	0.070
BD	35	0.236	0.093	BD	37	0.244	0.059
BE	35	0.172	0.090	BE	37	0.187	0.060
BF	35	0.230	0.042	BF	37	0.208	0.064
BG	35	0.181	0.092	BG	37	0.198	0.058
CD	35	0.216	0.079	CD	37	0.197	0.064
CE	35	0.255	0.086	CE	37	0.256	0.035
CF	35	0.283	0.084	CF	37	0.276	0.048
CG	35	0.208	0.086	CG	37	0.227	0.037
DE	35	0.250	0.053	DE	37	0.249	0.070
DF	35	0.237	0.050	DF	37	0.257	0.055
DG	35	0.313	0.092	DG	37	0.285	0.055
EF	35	0.210	0.072	EF	07	0.223	0.060
EG	35	0.260	0.072	EG	37	0.262	0.037
FG	35	0.236	0.101	FG	37	0.238	0.047

Table 20. Continued.

Variable	N	E Mean	SD	Variable	N	G Mean	SD
AB	15	0.260	0.111	AB	12	0.229	0.077
AC	15	0.225	0.092	AC	12	0.228	0.141
AD	15	0.257	0.069	AD	12	0.286	0.091
AE	15	0.304	0.090	AE	12	0.260	0.069
AF	15	0.251	0.156	AF	12	0.191	0.161
AG	15	0.124	0.097	AG	12	0.208	0.082
BC	15	0.204	0.078	BC	12	0.271	0.094
BD	15	0.158	0.101	BD	12	0.185	0.092
BE	15	0.182	0.079	BE	12	0.177	0.088
BF	15	0.252	0.126	BF	12	0.243	0.079
BG	15	0.214	0.114	BG	12	0.193	0.068
CD	15	0.203	0.033	CD	12	0.189	0.035
CE	15	0.307	0.109	CE	12	0.305	0.102
CF	15	0.290	0.079	CF	12	0.307	0.104
CG	15	0.233	0.033	CG	12	0.225	0.081
DE	15	0.239	0.068	DE	12	0.221	0.073
DF	15	0.237	0.092	DF	12	0.254	0.120
DG	15	0.274	0.060	DG	12	0.323	0.110
EF	15	0.211	0.070	EF	12	0.189	0.094
EG	15	0.254	0.069	EG	12	0.280	0.096
FG	15	0.283	0.098	FG	12	0.264	0.067

		F				H	
AB	18	0.197	0.097	AB	21	0.230	0.086
AC	18	0.183	0.091	AC	21	0.207	0.091
AD	18	0.222	0.105	AD	21	0.244	0.097
AE	18	0.254	0.102	AE	21	0.222	0.081
AF	18	0.176	0.122	AF	21	0.209	0.052
AG	18	0.192	0.109	AG	21	0.229	0.062
BC	18	0.268	0.087	BC	21	0.238	0.060
BD	18	0.194	0.109	BD	21	0.185	0.099
BE	18	0.142	0.116	BE	21	0.175	0.098
BF	18	0.232	0.105	BF	21	0.219	0.083
BG	18	0.175	0.075	BG	21	0.171	0.079
CD	18	0.164	0.113	CD	21	0.196	0.104
CE	18	0.236	0.118	CE	21	0.257	0.068
CF	18	0.241	0.120	CF	21	0.260	0.064
CG	18	0.165	0.085	CG	21	0.178	0.080
DE	18	0.184	0.094	DE	21	0.225	0.080
DF	18	0.170	0.101	DF	21	0.213	0.058
DG	18	0.279	0.100	DG	21	0.268	0.058
EF	18	0.157	0.110	EF	21	0.232	0.083
EG	18	0.200	0.077	EG	21	0.217	0.055
FG	18	0.225	0.117	FG	21	0.247	0.083

Table 20. Continued.

Variable	N	I Mean	SD	Variable	N	K Mean	SD
AB	33	0.236	0.099	AB	32	0.246	0.133
AC	33	0.217	0.123	AC	32	0.204	0.087
AD	33	0.252	0.091	AD	32	0.273	0.113
AE	33	0.254	0.111	AE	32	0.249	0.099
AF	33	0.213	0.119	AF	32	0.207	0.123
AG	33	0.211	0.096	AG	32	0.215	0.049
BC	33	0.263	0.111	BC	32	0.246	0.118
BD	33	0.222	0.117	BD	32	0.227	0.092
BE	33	0.196	0.105	BE	32	0.200	0.087
BF	33	0.224	0.098	BF	32	0.220	0.122
BG	33	0.227	0.084	BG	32	0.209	0.099
CD	33	0.218	0.122	CD	32	0.226	0.108
CE	33	0.289	0.108	CE	32	0.274	0.071
CF	33	0.257	0.104	CF	32	0.277	0.092
CG	33	0.242	0.097	CG	32	0.230	0.092
DE	33	0.252	0.106	DE	32	0.251	0.040
DF	33	0.244	0.100	DF	32	0.240	0.087
DG	33	0.287	0.104	DG	32	0.299	0.099
EF	33	0.238	0.108	EF	32	0.251	0.074
EG	33	0.270	0.090	EG	32	0.254	0.056
FG	33	0.269	0.110	FG	32	0.257	0.083

		J				L	
AB	35	0.221	0.100	AB	37	0.272	0.053
AC	35	0.201	0.069	AC	37	0.217	0.038
AD	35	0.262	0.093	AD	37	0.280	0.039
AE	35	0.265	0.075	AE	37	0.246	0.046
AF	35	0.184	0.087	AF	37	0.194	0.053
AG	35	0.238	0.074	AG	37	0.225	0.051
BC	35	0.278	0.088	BC	37	0.253	0.053
BD	35	0.224	0.096	BD	37	0.239	0.041
BE	35	0.177	0.091	BE	37	0.184	0.061
BF	35	0.225	0.069	BF	37	0.211	0.038
BG	35	0.192	0.086	BG	37	0.206	0.040
CD	35	0.198	0.085	CD	37	0.190	0.054
CE	35	0.272	0.083	CE	37	0.253	0.048
CF	35	0.297	0.087	CF	37	0.284	0.048
CG	35	0.225	0.087	CG	37	0.222	0.030
DE	35	0.252	0.064	DE	37	0.239	0.067
DF	35	0.228	0.064	DF	37	0.251	0.052
DG	35	0.308	0.094	DG	37	0.284	0.034
EF	35	0.227	0.066	EF	37	0.228	0.038
EG	35	0.261	0.072	EG	37	0.263	0.038
FG	35	0.240	0.092	FG	37	0.243	0.037

Table 20. Continued.

Variable	N	M Mean	SD	Variable	N	O Mean	SD
AB	15	0.225	0.062	AB	12	0.267	0.123
AC	15	0.205	0.066	AC	12	0.232	0.104
AD	15	0.261	0.076	AD	12	0.295	0.086
AE	15	0.266	0.049	AE	12	0.295	0.107
AF	15	0.257	0.115	AF	12	0.193	0.127
AG	15	0.137	0.123	AG	12	0.179	0.088
BC	15	0.218	0.052	BC	12	0.243	0.083
BD	15	0.203	0.127	BD	12	0.203	0.069
BE	15	0.184	0.087	BE	12	0.142	0.096
BF	15	0.264	0.088	BF	12	0.239	0.080
BG	15	0.253	0.116	BG	12	0.225	0.089
CD	15	0.188	0.070	CD	12	0.161	0.086
CE	15	0.288	0.100	CE	12	0.285	0.088
CF	15	0.238	0.102	CF	12	0.304	0.105
CG	15	0.206	0.074	CG	12	0.239	0.123
DE	15	0.233	0.046	DE	12	0.194	0.095
DF	15	0.251	0.086	DF	12	0.261	0.078
DG	15	0.266	0.069	DG	12	0.300	0.094
EF	15	0.209	0.075	EF	12	0.198	0.073
EG	15	0.263	0.046	EG	12	0.278	0.089
FG	15	0.299	0.107	FG	12	0.283	0.094
		N				P	
AB	18	0.210	0.075	AB	21	0.225	0.070
AC	18	0.202	0.059	AC	21	0.213	0.094
AD	18	0.237	0.106	AD	21	0.257	0.088
AE	18	0.268	0.080	AE	21	0.229	0.094
AF	18	0.197	0.090	AF	21	0.230	0.092
AG	18	0.219	0.087	AG	21	0.233	0.071
BC	18	0.263	0.067	BC	21	0.239	0.042
BD	18	0.210	0.103	BD	21	0.191	0.092
BE	18	0.196	0.102	BE	21	0.197	0.080
BF	18	0.224	0.091	BF	21	0.231	0.067
BG	18	0.200	0.086	BG	21	0.186	0.075
CD	18	0.219	0.109	CD	21	0.204	0.069
CE	18	0.243	0.086	CE	21	0.248	0.058
CF	18	0.255	0.089	CF	21	0.252	0.038
CG	18	0.225	0.086	CG	21	0.199	0.069
DE	18	0.227	0.082	DE	21	0.240	0.079
DF	18	0.202	0.082	DF	21	0.209	0.060
DG	18	0.272	0.100	DG	21	0.278	0.053
EF	18	0.181	0.090	EF	21	0.239	0.084
EG	18	0.233	0.028	EG	21	0.224	0.058
FG	18	0.231	0.090	FG	21	0.253	0.079

Table 20.
Codes.

Code	Question	Town	Pref	Sex
A	1	1	1	1
B	1	1	1	2
C	1	1	2	1
D	1	1	2	2
E	1	2	1	1
F	1	2	1	2
G	1	2	2	1
H	1	2	2	2
I	2	1	1	1
J	2	1	1	2
K	2	1	2	1
L	2	1	2	2
M	2	2	1	1
N	2	2	1	2
O	2	2	2	1
P	2	2	2	2

The data provided in Table 20 was then plotted using a histogram routine in SAS, and the standard deviations then obtained were entered into Table 21. The histograms plotted by this routine are contained in Appendix 6.

Of the 8 comparisons between preferences 1 and 2, it can be seen that in three cases there was more agreement in the community questionnaire, in two there is less, and in three there is no difference. This comparison has thus not supported hypothesis that the existence of community goals is supported by greater agreement in the responses obtained.

Table 21. Standard Deviations of 16 Distribution Functions of Responses to Goal Pairs

Question								
1				2				
Town				Town				
1		2		1		2		
Sex		Sex		Sex		Sex		
1	2	1	2	1	2	1	2	Preferences
.012	.017	.028	.013	.010	.011	.025	.017	1
.024	.016	.026	.015	.024	.010	.015	.016	2
—	0	+	—	—	0	+	0	1-2

CHAPTER 7.

THE EXPLANATORY POWER OF SOCIO-ECONOMIC CHARACTERISTICS

The Nature of the Hypothesis

Apart from the classical and modern neo-Marxian literature, little attention to or interest in the relationship between socio-economic parameters and preferences is to be found in economic analysis. Capitalists and workers are abstractions, and more interest is shown in functional, as opposed to personal variables. Sociologists, however, have been more concerned with such relationships and have attempted to study them systematically.

In Small Town and The Nation, Martindale and Hanson (1969) study the attitudes and preferences of 50 old-style and 50 new-style residents of Benson, Minnesota, the latter being younger, more highly educated, more professional people representing the outside world from which, for the most part they have come or from which they have obtained their education. The two groups exhibit different philosophies of socialization, in the fields of education, of health, and of religion.

Another study listed four hypotheses, the first being that upper socio-economic level respondents differ in their values from lower socio-economic level

respondents, which was confirmed in a test conducted on 51 respondents (Larsen and Sutker, 1966).

The purpose of this chapter is to determine to what extent the paired-responses could be associated with certain of the socio-economic characteristics obtained in the survey. In order to do this certain modifications to the data set were necessary in order to perform preliminary testing. The number of variables to be used was then reduced, and finally the method of canonical correlations was applied to the new data set.

Procedure

Of the data obtained in the survey, 13 variables, both classification and continuous, were selected as being possible predictors of responses. These were

1) SEX
2) MARITAL - married or single
3) HEAD - head of household or spouse
4) HHSIZE - size of household
5) RESPAGE - age of respondent
6) SPOUSAGE - age of spouse
7) RESPED - educational level of respondent
8) SPOUSED - educational level of spouse
9) ROCCUP - occupation of respondent
10) SPOCCUP - occupation of spouse

11) YRSCOMM - number of years lived in the community

12) PRERES - previous place of residence

13) INCOME - income of household.

A data subset for both towns was created, by eliminating those respondents who either had no spouse or were unwilling to reveal their annual income. The method of correlation analysis was then used on the continuous variables, and Chi-squares on the classification variables. By recording PRERES responses 8 as a 0, this variable could be treated as being continuous. The correlation coefficients for the two towns are provided in Tables 22 and 23, and the Chi-squares data in Table 24. For the latter tables, where a test was performed on a classification and a continuous variable together, the latter was grouped into the 5 quintiles of a frequency distribution.

Table 22.
Pella Correlation Coefficients Between 7 Socio-Economic Variables.

N = 103

	RESPAGE	SPOUSAGE	RESPED	SPOUSED	YRSCOMM	PRERES	INCOME
RESPAGE	1.000	0.964	-0.427	-0.386	0.631	-0.250	-0.040
	(.000)	(.000)	(.000)	(.000)	(.000)	(.010)	(.685)
SPOUSAGE	0.964	1.000	-0.394	-0.388	0.635	-0.273	-0.044
	(.000)	(.000)	(.000)	(.000)	(.000)	(.005)	(.663)
RESPED	-0.427	-0.394	1.000	0.625	-0.433	0.339	0.210
	0.000	0.000	0.000	0.000	0.000	0.000	0.031
SPOUSED	-0.386	-0.388	0.625	1.000	-0.421	0.365	0.269
	0.000	0.000	0.000	0.000	0.000	0.000	0.006
YRSCOMM	0.631	0.635	-0.433	-0.421	1.000	-0.555	0.016
	0.000	0.000	0.000	0.000	0.000	0.000	0.859
PRERES	-0.250	-0.273	0.339	0.365	-0.555	1.000	-0.043
	0.010	0.005	0.000	0.000	0.000	0.000	0.664
INCOME	-0.040	-0.044	0.210	0.269	0.016	-0.043	1.000
	0.685	0.663	0.031	0.006	0.859	0.664	0.000

Table 23.
West Union Correlation Coefficients Between 7 Socio-Economic Variables.
West Union Correlation Coefficients.

N=50	RESPAGE	SPOUSAGE	RESPED	SPOUSED	YRSCOMM	PRERES	INCOME
RESPAGE	1.000	0.979	-0.335	-0.473	0.607	-0.100	-0.422
	0.000	0.000	0.016	0.000	0.000	0.505	0.002
Spousage	0.979	1.000	-0.385	-0.482	0.602	-0.115	-0.398
	0.000	0.000	0.005	0.000	0.000	0.571	0.004
Resped	-0.335	-0.385	1.000	0.505	-0.166	0.247	0.366
	0.016	0.005	0.000	0.000	0.246	0.079	0.008
Spoused	-0.473	-0.482	0.505	1.000	-0.430	0.500	0.594
	0.000	0.000	0.000	0.000	0.002	0.000	0.000
Yrscomm	0.607	0.602	-0.166	-0.430	1.000	-0.440	-0.360
	0.000	0.000	0.246	0.002	0.000	0.001	0.009
Preres	-0.100	-0.115	0.247	0.500	-0.440	1.000	0.259
	0.505	0.571	0.079	0.000	0.001	0.000	0.065
Income	-0.422	-0.398	0.366	0.594	-0.360	0.259	1.000
	0.002	0.004	0.008	0.000	0.009	0.065	0.000

Table 24.
Chi-Squares Data For Selected Socic-Economic Characteristics[1]

	VARIABLES		Pella			West Union		
			CHISQ	DF	PROB>THAN	CHISQ	DF	PROB>THAN
1)	SEX	HEAD	103.0	1	0.0001**	50.00	1	0.0001**
2)	SEX	RESPED	9.94	4	0.041**	10.72	4	0.030**
3)	SEX	SPOUSED	0.35	4	0.900	0.85	4	0.930
4)	SEX	ROCCUP	58.55	9	0.0001**	24.84	9	0.003**
5)	SEX	SPOCCUP	59.82	9	0.0001**	35.62	9	0.001**
6)	HHSIZE	RESPED	26.02	16	0.050*	30.85	24	0.158
7)	HHSIZE	SPOUSED	12.16	16	0.734	27.60	24	0.277
8)	HHSIZE	INCOME	20.82	20	0.408	45.36	30	0.036**
9)	RESPAGE	ROCCUP	54.02	36	0.027*	38.54	36	0.354
10)	RESPAGE	SPOCCUP	41.21	36	0.253	40.60	36	0.275
11)	SPOUAGE	SPOCCUP	31.23	36	0.695	34.67	36	0.532
12)	RESPED	ROCCUP	76.82	36	0.0001**	48.76	36	0.076**
13)	SPOUSED	SPOCCUP	84.46	36	0.0001**	41.96	36	0.228
14)	ROCCUP	SPOCCUP	105.72	81	0.034*	73.61	81	0.708
15)	PRERES	ROCCUP	36.15	36	0.462	30.39	45	0.953
16)	INCOME	ROCCUP	65.12	45	0.027**	42.39	45	0.584

[1] **See code on page 214.**

In both the correlation and the CHISQ tests the null hypothesis of no association--or independence--is frequently rejected. This is particularly true of variable-pairs involving respondent and spouse, for both towns. In the two tables of correlation analysis the levels of correlation for both towns are the same for all pairs except for the INCOME-PRERES, INCOME-YRSCOMM pairs, which are only significant in the West Union case. In the CHISQ tables the null hypothesis is rejected more frequently in the Pella case.

In conducting tests of multiple associations two problems arise:

1) multicollinearity

2) too large a number of variables.

Multicollinearity In the general linear model the data matrix X, (n x k), is assumed to have rank k, i.e. no linear dependence between any of the X(i) is assumed. One problem which would arise where this assumption is not fulfilled is that the relative influence of the X(i) would be difficult to determine.

Number of predictors The use of Occam's Razor is a well established pratice in economics. Where 5 variables will provide information or predictive power 10 are unnecessary.

Approach Followed

A complete analysis of the relationships between these 13 variables would require the use of path coeficients to determine causality as well as correlation. Thus one might be tempted to develop the following relationships based on the data in Tables 22-24.
Such a system would indicate that younger people with better education, are more likely tc have moved into the community than have been brought up there, and have better or higher paying jobs.

However, it is dangerous to speculate on such paths with insufficient evidence, and in this study the information available was used only to reduce the number of explanatory variables.

Variables Chosen

1) SEX
2) HHSIZE
3) RESPAGE
4) RESPED
5) PRERFS
6) INCOME.

These variables were chosen because of the low correlation/association between them, or, where this does not hold, because one of the twc was in turn

uncorrelated with a third non-continuous random variable, the latter being less adequate for analysis than continuous random variables. The 21-response variables consist of both individual and community responses. As the earlier analysis showed no significant difference between these two sets of responses there seemed no reason to undertake analysis of them separately.

Correlation Analysis

Results of the correlation analysis are published in Table 25. Significance levels have been provided for those coefficients reported significant at 94% or greater.

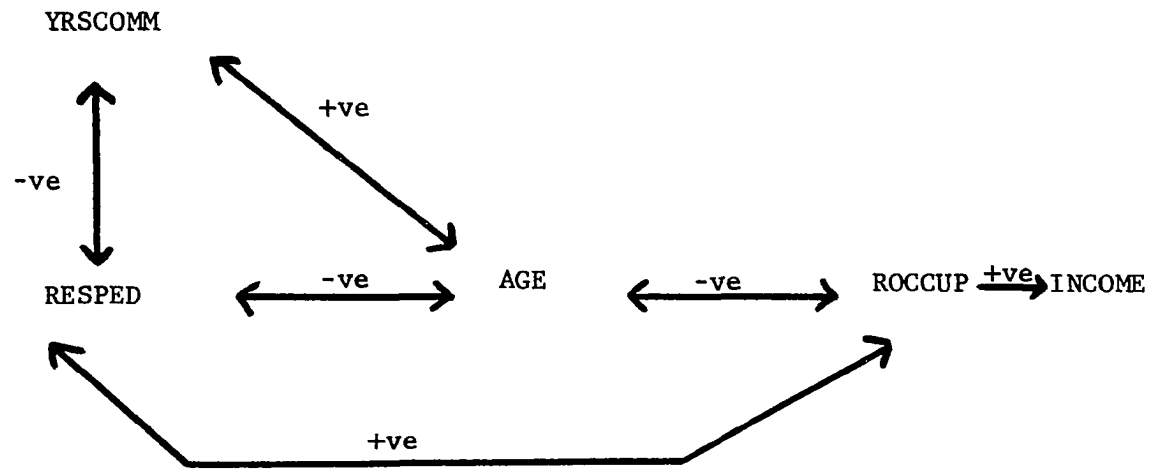

Figure 7. Hypothetical Path Analysis of Relationship Between Certain Socio-Economic Variables

Table 25.
Correlation Between 6 Variables and Responses

	AB	AC	AD	AE	AF	AG	EC	BD	BE	BF
Pella										
SEX	.08	.03	.00	.01	-.06	.22 .01	.04	.19 .02	-.10	-.05
HHSIZE	.02	-.02	-.06	.01	-.05	.02	.09	.00	-.03	.03
RESPAGE	.06	.16 .05	.13	.07	-.16 .06	.15	.02	.05	-.10	-.07
RESPED	.00	.19 .02	-.04	-.22 .01	.05	.04	.08	-.01	.13	.10
PRERES	-.17 .04	.08	-.21 .02	-.02	-.02	.01	.15	-.11	.00	.14
INCOME	-.01	-.16 .05	.10	.06	-.02	-.08	.01	-.12	-.13	-.02
West Union										
SEX	-.18	-.06	-.17	-.18	-.07	.36	.20	-.02	.16	-.16
HHSIZE	.15	.16	.04	-.02	.33 .01	-.27 .02	-.29 .02	-.11	.25 .04	.29 .01
RESPAGE	-.11	-.12	-.10	.02	-.13	.05	.25 .04	.04	-.24 .04	-.18
RESPED	.24 .05	.33 .01	-.11	-.01	.16	-.15	.06	.03	.16	.21
PRERES	.29 .01	.30 .01	.00	-.06	.26 .03	.15	.08	-.11	.11	.25 .04
INCOME	.21	.33	-.06	-.18	.22 .06	-.13	-.22	-.09	.30 .01	.23 .06

[1] NSC: Number of significant coefficients

BG	CD	CE	CF	CG	DE	DF	DG	EF	EG	FG	NSC[1]
-.05	-.06	-.20	.10	.13	-.13	.08	-.06	-.09	.07	-.18 .03	3
.01	.04	.05	.01	.09	.00	.11	.10	.11	.00	.13	-
-.04	-.09	-.04	-.01	.00	.15	-.12	.11	-.12	.20 .01	-.05	3
-.03	.17 .05	-.08	.00	.03	.05	.15	-.08	.23 .01	-.05	.04	4
-.11	.14	-.06	.11	.11	.00	.00	-.01	.06	-.18 .02	.00	3
-.14	-.16 .05	.13	-.04	-.11	-.05	-.05	.13	-.04	.06	.11	2
-.26	.21	-.25 .05	-.08	-.06	.11	-.34 .01	-.03	.04	-.36 .01	-.28 .02	4
.25 .04	-.03	.41 .01	-.06	.12	-.08	.24 .04	-.15	.22 .06	.12	.48 .01	10
-.11	-.01	-.34 .01	.03	-.06	.04	-.24 .04	.11	-.35 .01	-.10	-.42 .01	6
.20	-.07	.26 .03	.19	.31 .01	-.26 .03	.33 .01	-.03	.19	.16	.36 .01	7
.20	-.03	.27 .02	.09	.05	-.14	.20	.00	.07	.06	.33	5
.16	.09	.18	-.01	.14	-.12	.21	-.22	.33 .01	-.06	.41 .01	5

None of the coefficients is greater the 0.5, even though values of .2 and above are reported as significant. In the case of Pella the variable RESPED is reported as having the largest number of correlations, but only 4, whereas in the case of West Union HHSIZE has 10 significant correlations, RESPED 7 and RESPAGE 6.

Two main explanations of the relatively low correlation between the two sets of data can be produced:

(a) errors in the data, particularly measurement problems.

(b) mis-specification errors.

Mis-specification errors It is conceivable that the socio-economic characteristics selected above are not as significant as certain others which have been omitted from this study. Had these been included their contribution would have been more marked. In this context it is well to refer back to the comments made by Wallis and Friedman (1942) (see Chapter 3) concerning the problem of measuring indifference curves. In particular, the location of a community on an n-dimension community services possibility curve may be more significant than the shape of the preference function itself. Thus, for example, HHSIZE appears to

be concerned with goals F (Health Care) and G (Public Education) in West Union, but not in Pella. This difference could be accounted for by the difference in the currently available level and quality of these two services in the two towns, rather then by any difference in preferences.

Canonical Correlation Analysis

Although the individual correlation values are low, several are still statistically significant. In order to see what the overall contribution of these 6 variables is to the variance in the 21 pairs, a canonical correlation test was udertaken.

The method of canonical correlation analysis is performed on two multivariate subsets to determine the joint correlation between the two (Morrison, 1967). In this case the matrix X consists of

(1) $X = [\, X(1), X(2) \,]$ $X(1) = 203 \times 7$

$X(2) = 203 \times 21$

and the associated parameters are

(2) $U = \begin{bmatrix} U(1) \\ U(2) \end{bmatrix}$ $\quad Sigma = \begin{bmatrix} Sigma(1,1) & Sigma(1,2) \\ & Sigma(2,2) \end{bmatrix}$

A test of independence of the two sets is given by

(3) $H(0): SIGMA(1,2) = 0$

$H(1): SIGMA(1,2) \neq 0.$

From the two sets of response variates the following linear combinations are formed

(4)
$$u(1) = a(1)'X(1) \qquad v(1) = b(1)'X(2)$$
$$u(2) = a(2)'X(1) \qquad v(2) = b(2)'X(2)$$
$$\vdots \qquad\qquad \vdots$$
$$u(n) = a(n)'X(1) \qquad v(n) = b(n)'X(n)$$

such that, for any i, SIGMA now becomes:

(2a)
$$\begin{bmatrix} a(i)'SIGMA(11)a(i) & a(i)'SIGMA(12)b(i) \\ a(i)'SIGMA(12)b(i) & b(i)'SIGMA(22)b(i) \end{bmatrix}$$

and replacing SIGMA by S, its sample estimate, the correlation is

(5)
$$r(a(i),b(i)) = \frac{a(i)'S(1,2)b(i)}{(a(1)'S(1,1)a(i)b(i)'S(2,2)b(i))^{0.5}}$$

However, the number of (ab) pairs to be chosen needs to be limited to as few a number as possible subject to finding u(i)v(i) with the greatest sample correlation, each pair of u(i)v(i) being uncorrelated with each other. This is achieved by selecting the largest root of the determinantal equations in the solution of the maximum value of (5).

Table 26.
Canonical Correlations.

	Pella			West Union		
		Group 1	Group 2		Group 1	Group 2
Mean1	-.155	.029	.151	.003	.099	-.166
Mean2	-.05	-.028	-.930	-.271	-.012	-.115
Cancorr	.614	0	.426	.787	.003	.378
Chisq	152.3	-.024	.638	140.8	-.016	-.440
DF	126	.008	.128	126	-.020	.090
Signif.	.055	.060	.425	.173	-.014	.079
			.257			.532
			-.183			-.518
			.204			-.443
			.434			.449
			-.231			.338
			-.139			.076
			-.235			-.864
			.192			-.249
			.226			.256
			-.547			.419
			-.581			.242
			-.650			-.169
			-.539			-.079
			.291			.750
			.950			-1.109

Canonical Correlation Results

The results of the test are shown in Table 26. The weights are the first element of the two normalized characteristic vectors associated with each group. Only the first result is given as none of the others were significant. In these results we see that there is a significant canonical correlation between the two sets of data in Pella, but not in West Union.

These results are provided for the benefit of those interested in such methods. As with all such methods where linear combinations are used to develop synthetic variables, the problem of interpreting their meaning is usually unresolved.

CHAPTER 8.

CONCLUSIONS

The Hypothesis

It was argued in the study that rural community development involves the process whereby the value of rural goals is increased. The problems this study had to face were:

1) knowing which goals were essential,

2) a process of weighting these goals,

3) developing a means to measure the value of these goals.

In investigating the means whereby group decisions are formed, it was argued that this same procedure is the means whereby group or community goals are determined. These goals may be the outcome of a conflict which is resolved in which ever way those involved determine such conflicts, or a set of goals which are widely held through a strong consensus.

Simulation of Goal's Determination

Because of the complex nature of the above processes, some procedure more amenable to experimental analysis is required. It was suggested that the Delphi method is one such procedure, though this too is an involved and expensive approach, not lacking its own difficulties when using the full open-ended techniques.

However, it can be assumed that some of the information required can be obtained without the need for the full Delphi technique. It can be argued that most people have some idea of the nature and weight they attach to certain community goals, and as a result of their past decisions and experiences of the community they reside in, one should be able to obtain this information by an appropriate survey instrument. One test of this hypothesis is to compare individual goals with community goals. A test for the existence of community goals would be greater agreement (less variance) in the community than in the individual goal responses.

The Survey Instrument

A survey instrument was developed to obtain both individual and community goals. Whereas the indirect approach requires price data and the direct approach involves the ability to generate an indifference curve, the approach adopted here examines the "expenditure" bundles directly. Its value lies in the fact that most decisions are made in this framework, and also in the way in which this allows the community-individual (or public-private) continuum to be expressed in the same resource allocation format. Thus, instead of a public or private dichotomy, the degree of publicness of a set

of goals is expressed in the levels cf community resources people are willing to spend on these goals.

A disadvantage of this approach, unlike the other two, is that it assumes the trade-off between each pair of goals is linear, whereas one would like to know the sensitivity of the solutien to variations around the optimum point.

The Ranks Obtained

The weights and their ranks were obtained for both towns for the individual and community, as well as, for the $1, $10,000 questions. Using the rank correlation and multivariate F test, significant differences were found between towns, but not for the other two comparisons.

One possible explanation of the failure to detect any significant difference between the $1-$10,000 question could be the assumed low productivity of $10,000 to effect much change on the current situation as described in the questionnaire. Thus if respondents feel that an improvement in public health requires a minimum of $1 million, it will be assumed that $10,000 will have no impact and will not lead to any change in the allocation from the $1 situation. A second possible reason for the failure of this test, relative to the above point, is the problem of different respondents

having different perceptions of the marginal productivity of $10,000. As a result, changes in the allocation of funds between a goal-pair may reflect these different perceptions as much as any income effect.

The failure of the community-individual test also warrants explanation. Both the MANOVA test and the comparison of the variance of the responses failed to support the argument of a set of community, distinct from a set of individual goals. One possible reason is that the questionnaire only considered public goods which cannot be internalized to become individual goals. Hence, public safety is a public goal for which no private demand exists. Thus, the respondents demand for public health will be a reflection of the community's goals in both the public and private context.

If the lack of significance is a consequence of there not being any genuine difference in the two sets of goals then there may indeed be cause for rejoicing, for the concern with obtaining weights for public goods would be shown to be based on an undue fear of the liar's problem. Consequently, the responses from the individual questionnaire would suffice. However, if there is a genuine difference the test has so far failed to detect it, leaving open the question of whether or

not the respondents are aware of the distinction. Although in principle it should be possible to design the test using a 2-factorial design, in practice the application of such a survey may pose a problem. In conducting a survey respondents have to be made to feel that their co-operation and assistance is valuable, and that they are not being examined or tested. One danger with the factorial design could arise if the respondent were firstly asked to respond to the individual questionnaire and secondly to the community one. A respondent may feel that such a format is designed to test the degree of civic-mindedness or concern with public affairs, and consequently to evaluate the "worth" of the respondent as a member of the community. Thus, any attempt to further investigate the community-individual distinction will have to bear this in mind.

Generally speaking, the residents of Pella and West Union are equally concerned about environmental quality, recreation and leisure facilities, and the size of family income. Whereas people in Pella seem to be more concerned with health and education, West Union's population is more concerned with public safety and income inequality. However, although this refers to relative concern, it gives no indication of the

intensity of the concern felt by the members of the two towns.

The differences in relative rankings can be accounted for in two ways. Firstly by the perceptions of the respective residents of their town's needs and requirements, and secondly by the different circumstances each town experiences. Thus West Union could be more concerned with public safety either because its perceptions of safety are more demanding, or, and more likely, because of the poorer facilities currently available to West Union. Of the three results which produced approximately similar rankings in both towns, it may be noted that raising incomes is ranked either first or second in all cases. On the basis of this evidence it would seem that the effort currently being placed on rural industrialization is warranted.

Some Suggested Uses

The purpose in undertaking this study was to propose a means for measuring development and consequently for evaluating projects and policies contributing to this end. In order to determine the degree to which this has been met, the possible uses for this procedure, by extension and other workers, need to be considered.

Budget Comparisons

The first suggested use is in comparing the budget allocation obtained from the survey with the actual town expenditure patterns. A discrepancy could indicate some need for reallocation. However, it should be remembered that the definition of community resources in this study includes both public and quasi-public funds and grants. Thus a complete comparison would require that a full community budget be obtained to compare with the survey results.

Extrapolation To Other Towns

In order to use the results obtained in one town as a guide for policy making in others, two assumptions have to hold:

(a) similar tastes,

(b) similar conditions.

At the level of generality of the goals used in this study it might be plausible to argue that communities in Iowa may have relatively similar tastes. However, proof of such an assumption lies in conducting the survey itself. If, however, certain indicators of preferences and tastes exist, such as religion and education, then these might be used to group towns.

Although the similarity of conditions, in principle, can be tested objectively, in practice many

obstacles and difficulties exist in some cases. Thus, although the level of public education can be measured in terms of the number of school enrollments per 100 people (which, even then, measures the input, not the output), measures of public safety and environmental quality pose as yet unresolved problems which this study was designed to circumvent, not answer.

Probably the most useful criterion for grouping towns, and one used for many other purposes, would be size or a size-related one. Given the economics of scale which exist in the provision of certain public services, size is likely to be an important determinant of the similarity of conditions between towns. Thus, by sampling within each size range the results can be extended to all towns within that range without the problem of confusing goals with perceived needs.

Annual Surveying

A third possible use would be to modify the technique to enable towns to conduct the study themselves, on an annual basis, as part of the budgeting framework. Although the full community budget would differ from the municipal one, and although political and administrative agencies for certain services do not always coincide with a municipality, in principle allowance can be made for these factors. Towns could be

assisted either by training personnel to conduct and analyze the survey, or by performing certain tasks through the extension service.

Opportunities for Further Research

The three aproaches to measuring goals referred to in this study are

1) the expenditure approach, used here,

2) the revealed preference or price approach,

3) the direct or indifference curve approach.

In all cases further work on determining an appropriate set of goals which is consistent in terms of a common hierarchy would be well received. Such research would help reduce the tendency for double counting which undoubtedly exists in much current work, and at the same time allow some current ad hoc work to be integrated into more formal models.

The Expenditure Approach

As with all survey work of an experimental nature, one problem with this approach is the need to ensure that the respondents are aware of the significance of the different levels of the community's resources available to them. Above all, the need to avoid the tax-burden problem, which seemed to be a problem in the pre-test, though not so much in the actual survey, must be faced.

The Revealed Preference Approach

With many of the goals being studied in this and similar work, no market to provide price data exists. However, in certain cases indicators or proxies could be used. Thus, in the case of public safety the level of private expenditure on household fire and theft safety devices might be one way of obtaining such preferences.

However, in accepting such an approach one must face up to the problem that the results obtained would be a function of the current distribution of income. Secondly, such indicators of private concern are not directly translatable in to expressions of public goals. In using this approach both these problems would have to be overcome.

The direct approach This probably offers more scope for further work then the revealed preference approach. However, in many cases prices or indicators would have to be used which requires some procedure for the appropriate selection and aggregation of them.

One problem with this approach which was discussed is the implication that choices are normally made using some type of indifference-curve process which in turn implies that respondents are capable of making consistent, transitive choices between pairs of goals. As the error test showed, only 15 respondents gave

intransitive responses, yet at the same time this cannot be taken as evidence of the complete success of this or any other choice-situation framework. The reason for this caveat lies in the distribution of the responses which were seen to be quite bunched around mean values. Thus the respondents "played safe", and used a least-squares approach rather than a maximum likelihood one. This could be explained by the lack of familiarity with the outcome of making certain choices. Given more time to consider and learn the implications of various choices - i.e. given greater information - respondents would be able to consider a greater range of possible trade-offs and thus overcome the tendency to bunch around an ideal point. Thus, rather than use what must in many cases be an alien approach, one could consider developing a procedure for obtaining choices which follows actual choice behavior as closely as possible. Such a choice-algorithm would have to involve input from the behavioral sciences.

Conclusion

Each of three approaches offers its own advantages and suffers from its own drawbacks. However, there is no reason why each cannot be used for certain purposes, and the results combined to give greater insight. It is probably in this area of combined work that the scope for future potential lies.

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APPENDIX 1: MEASURING THE QUALITY OF LIFE

List A. Concerns and Indicators

1) novelty	1) health	1) aesthetic	1) novel
2) peace of mind	2) status	2) freedom	2) health
3) social acceptance	3) affluence	3) pleasurable	3) dominance
4) comfort	4) activity	4) meaningfulness	4) self-respect
5) dominance	5) sociality	5) newness	5) challenge
6) challenge	6) freedom	6) aggression	6) freedom
7) self-respect	7) security	7) sexual fulfillment	7) comfort
8) privacy	8) novelty	8) security	8) affection
9) involvement	9) aggression	9) dominance	9) security
10) love		10) affection	10) achievement
11) achievement		11) fun	11) status
12) individuality		12) status	12) involvement
13) sex			

OECD (See Appendix 2)

1) health
2) individual development through learning
3) employment and the quality of working life
4) time and leisure
5) command over goods and services
6) physical environment
7) personal safety and justice
8) social opportunity and participation

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1) survival
2) physical and psychological
4) improvement of satisfactions -- range and quality
5) hope
6) capacity of make choices
7) freedom to exercise choices
8) personal dignity
10) belief/value system
11) sense of possibility of fulfilling
12) aspirations

Social Indicators 1973

1) good health and long life

2) freedom from crime and the fear of crime
3) sufficient education to take one's part in society, and make the most of one's abilities.
4) the opportunity to work at a job that is satisfying and rewarding
5) income sufficient to cover the necessities of life, with opportunities for improving one's income
6) housing that is comfortable with a congenial environment
7) time and opportunity for discretionary activites.

1960 Report of the President's Commission on National Goals

1) the individual
2) equality
3) the democratic process
4) education
5) arts and sciences
6) economic growth
7) democratic economy
8) technological change
9) agriculture
10) living conditions
11) health and welfare

Stanford Reseach Institute 1971

1) health
2) opportunity
3) environment
4) standards of living
5) public safety
6) learning
7) democratic values

List B. Groupings of Concerns/Indicators

Adelman & Morris	Becker & deBrigard	Maslow
(environments)		(need ordering)
1) sociocultural (12)	1) social	1) physiological
2) political (12)	2) physical	2) safety
3) economic (17)	3) economic	3) belongingness and love needs
		4) esteem needs
		5) need for self-actualization

APPENDIX 2: SOCIAL INDICATORS

List of Social Concerns Common to Most Countries

HEALTH

A-1 The probability of a healthy life through all stages of the life cycle.

A-2 The impact of health impairments on individuals.

INDIVIDUAL DEVELOPMENT THROUGH LEARNING

B-2 The acquisition by children of the basic knowledge, skills and valuenecessary for their individual development and their successful functioning as citizens in their society.

B-2 The availability of opportunities for continuing self-development and the propensity of individuals to use them.

B-3 The maintenance and development by individuals of the knowledge, skills and flexitility required to fulfill their economic potential and to enable them to integrate themselves in the economic process if they wish to do so.

B-4 The individual's satisfaction with the process of individual development through learning, while he is in the process.

B-5 The maintenance and development of the cultural heritage relative to its positive contribution to the well-being of the members of various social groups.

EMPLOYMENT AND QUALITY OF WORKING LIFE

C-1 The availability of gainful employment for those who desire it.

C-2 The quality of working life.

C-3 Individual satisfaction with the experiences of working life.

TIME AND LEISURE

D-1 The availability of effective choices for the use of time.

COMMAND OVER GOODS AND SERVICES

E-1 The personal command over goods and services.

E-2 The number of individuals experiencing material deprivation.

E-3 The extent of equity in the distribution of command over goods and services.

E-4 The quality, range of choice and accessibility of private and public goods and services.

E-5 The protection of individuals and families against economic hazards.

PHYSICAL ENVIRONMENT

F-1 Housing conditions.

F-2 Population exposure to harmful and/or unpleasant pollutants.

F-3 The benefit derived by the population from the use and management of the environment.

PERSONAL SAFETY AND THE ADMINISTRATION OF JUSTICE

G-1 Violence victimization and harassment suffered by individuals.

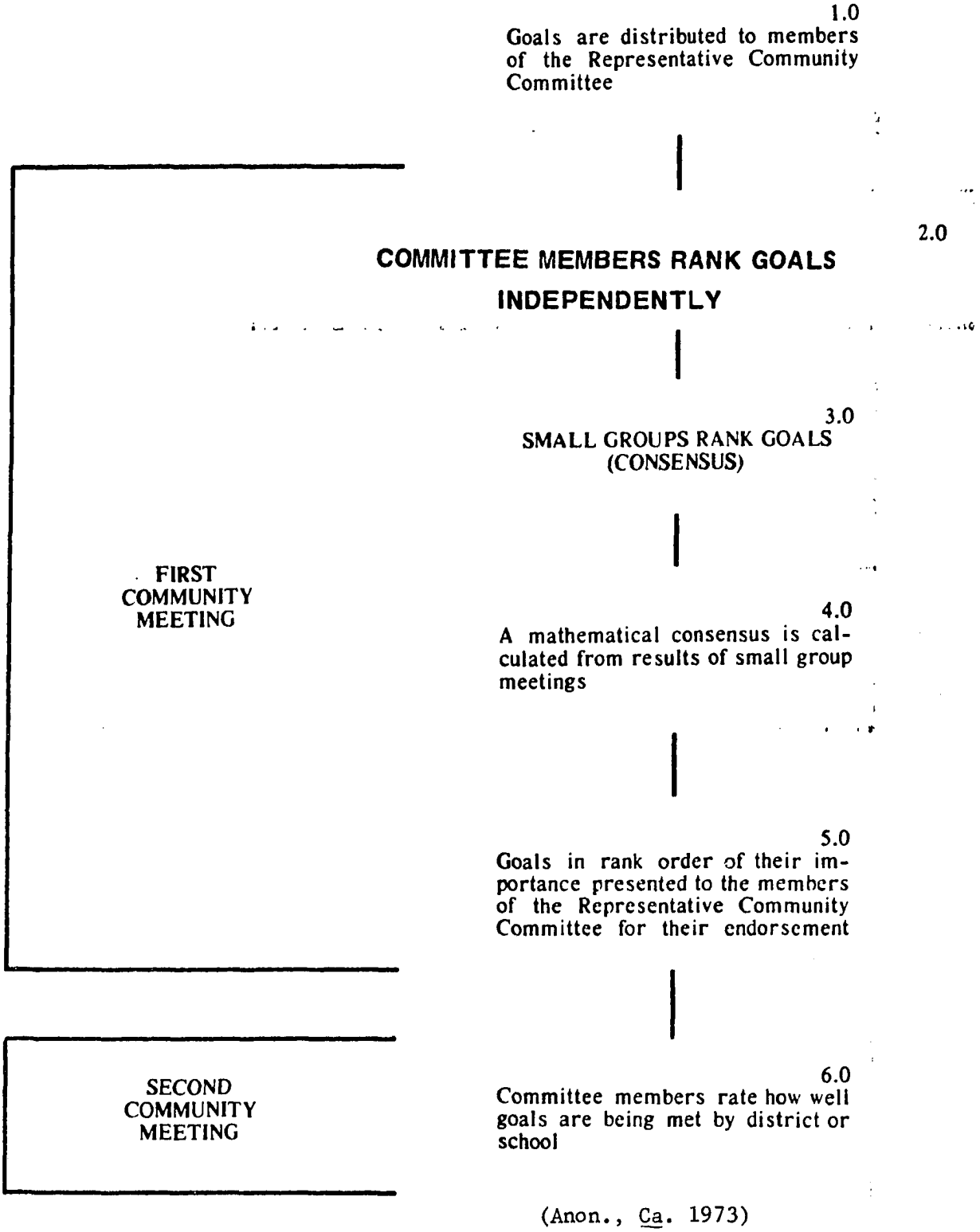
G-2 The extent of confidence in the administration of justice.

SOCIAL OPPORTUNITY AND PARTICIPATION

H-1 The degree of social inequality.

H-2 The extent of opportunity for participation in community life, institutions and decision-making.

APPENDIX 3: GOAL-RANKING STRATEGY



(Anon., Ca. 1973)

APPENDIX 4

CITIZEN-LEGISLATIVE INTERACTION IN THE WEIGHTING PROCESS

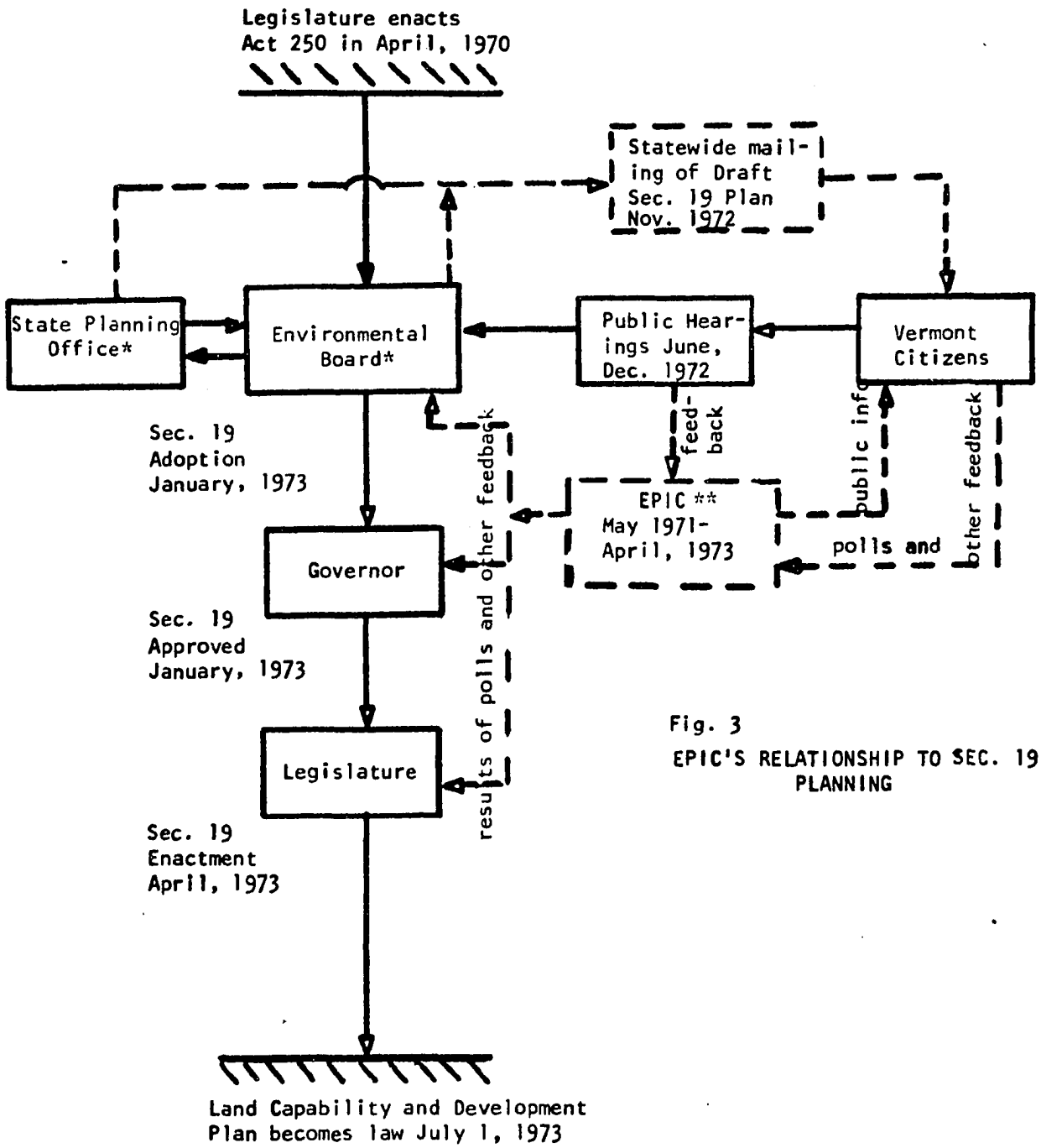


Fig. 3

EPIC'S RELATIONSHIP TO SEC. 19 PLANNING

*During the period June 1972-Jan. 1973 when the preparation and drafting of the Capability and Development Plan occurred, Benjamin W. Partridge was simultaneously Chairman of the Environmental Board and Director of State Planning.

**It should be observed that EPIC's public information and polling activities occurred before and after the statewide mailing of the draft Sec. 19 Plan.

Citizen-Legislative Interaction in the Weighting Process

(Citizen Participation Project, 1973, Fig. 3)

APPENDIX 5A:

THE SURVEY

IOWA STATE UNIVERSITY

DEPARTMENT OF ECONOMICS

AND

STATISTICAL LABORATORY

A Study of Community Goals

Respondent's name_____ Segment No. _____ H.H. No. _____

Street address_____ Interviewer _____

City_____ Date _____

Phone No._____ Starting time _____

Hello. I am _____ from Iowa State University at Ames. The University is interested in talking with the residents of this community to determine some of the things which you think make your community a better place in which to live. Your residence was selected at random as part of a sample of households in two Iowa communities.

The answers of all the respondents in this community will be combined to give a total picture of the goals and desires of the residents. All answers are confidential and you will not in any way be identified by the results of this study.

As we go through this questionnaire, we will be asking for your attitudes and opinions. That means there are no "right" or "wrong" answers to the questions. Other people may think differently, but we are interested in your own views and opinions.

Let's begin by talking about goals a community may have and some of the activities or services available for meeting these goals.
(INTERVIEWER: Hand R the BLUE card)

Take a look at the blue sheet. Listed on the left side are some goals a community may have. Let's read thru the seven goals.

Opposite each goal are some community activities or services. An increase in the level of one or more of these activities or an improvement in their quality, would help a community in reaching a particular goal. For instance, if a community were to raise the level or improve the quality of fire protection, this would lead to an increase in public safety in the community. The same would be true of the other activities listed for the goal of increasing public safety. If a community were to improve its air or water quality, that action would lead to an increase in environmental quality.

The activities we have listed on the sheet are meant to be examples. There may be other activities or services which would apply to a specific community.

Let's read thru the list of activities for each goal so we can get them firmly in mind. If you have any questions as we go along, please stop me so we can discuss the goal or activity in more detail.

Col. A, Goals	Col. B, Activities
	Raising the level or improving the quality of:
A) Increasing public safety:	Fire protection, police protection emergency services, street lighting, flood protection, traffic safety.
B) Increasing the average family income	Jobs, pay scales, business activity.
C) Reducing income inequalities:	Assistance to the poor, assistance to families with dependent children, lower cost housing for the poor, help with meals for the poor.
D) Increasing recreation and leisure facilities:	Town parks, nature areas, fishing, boating, sports areas, golf courses.
E) Increasing environmental quality:	Air quality, water quality, zoning regulations, downtown renewal, clean-up campaigns, beautification projects.
F) Increasing health care:	Physician care, nursing care, community hospitals, sanitation services.
G) Increasing public education:	Day schools, evening classes, pre-schools, adult education, libraries.

These community goals we have been talking about affect you and all the people in your community. Your community uses its resources to improve these goals so that you and other members of the community can enjoy them more. Unfortunately, community resources are limited, and choices have to be made: how much to spend on health care, how much to spend on education, and so on. Now we want to discuss in what way the community should allocate its resources so that it would be of the greatest benefit to the most people.

INTERVIEWER: Hand R the set of WHITE goal-pair cards.

Listed on each of these cards are two of the community goals. For example, on the first card the two goals are Increasing Environmental Quality and Increasing Public Education. Now suppose an additional one dollar of community resources is going to be spent on these two goals. Community resources includes money spent by groups such as churches, local volunteer groups and the Chamber of Commerce as well as taxes collected by your community.

We want to know how your community should divide an additional dollar between each pair of goals. Please note, we are asking for your opinion about the way in which a dollar can be spent for the most benefit for all the people of the community. If you think the community would receive a great deal of benefit from spending its money on improving one goal, the community should spend the entire dollar on that goal, leaving nothing for the other one. On the other hand, if you think the community would receive only somewhat more benefit from spending on that goal, you might spend, say, 70¢ on it and spend the remaining 30¢ on the less important goal. If you think the benefits to the community to be about equal, you might spend 50¢ on one and 50¢ on the other goal. In other words, the amount you think the community should spend on one goal relative to the other indicates the relative worth or importance to the community of the two goals.

I might point out that since one dollar is only a small increase in the community's resources now being spent, the way in which the community chooses to spend it on each pair of goals won't change the present situation of those two goals in the community very much.

Do you have the idea now? Fine, let's try the first pair of goals.

INTERVIEWER: Record response for the first pair of goals, and continue.

Now turn to the next card and let's think about the next pair of goals. How do you think the dollar should be spent so that it would be of the greatest benefit to the most people.

Allocation of One Dollar

1.	Environmental quality . . . . ___¢	___¢	Public education
2.	Health care . . . . . ___¢	___¢	Public education
3.	Environmental quality . . . . ___¢	___¢	Health care
4.	Public safety . . . . . ___¢	___¢	The average family income
5.	Income inequalities . . . . . ___¢	___¢	Recreation & leisure facilities
6.	The average family income . . ___¢	___¢	Income inequalities
7.	Recreation & leisure facilities . . . . . ___¢	___¢	Environmental quality
8.	Public safety . . . . . ___¢	___¢	Income inequalities
9.	The average family income . . ___¢	___¢	Recreation & leisure facilities
10.	Income inequalities . . . . . ___¢	___¢	Environmental quality
11.	Public safety . . . . . ___¢	___¢	Recreation & leisure facilities
12.	The average family income . . ___¢	___¢	Environmental quality
13.	Income inequalities . . . . . ___¢	___¢	Health care
14.	Recreation & leisure facilities . . . . . ___¢	___¢	Public education
15.	Public safety . . . . . ___¢	___¢	Environmental quality
16.	The average family income . . ___¢	___¢	Health care
17.	Public safety . . . . . ___¢	___¢	Public education
18.	Recreation & leisure facilities . . . . . ___¢	___¢	Health care
19.	The average family income . . ___¢	___¢	Public education
20.	Public safety . . . . . ___¢	___¢	Health care
21.	Income inequalities . . . . . ___¢	___¢	Public education

SECTION II

We have been talking about dividing one additional dollar between different pairs of goals. Now, thinking of the same seven community goals and assuming your community had an additional $10,000 of resources, we want to know how the community should divide this $10,000 between each pair of goals. Keep in mind that the purpose of the allocation is to provide the most benefit for all the people of the community. As before, community resources includes money spent by groups such as churches, local volunteer groups and the Chamber of Commerce as well as taxes collected by your community.

The amount now is a much larger increase in the amount spent by the community and could perhaps make significant changes in the present situation regarding each pair of goals. Please remember-we are asking for your opinion about the way in which $10,000 should be spent in order to provide the greatest benefit to all the people of the community. Please turn back to Card 1 and tell me how you think the community should divide this $10,000 between the first two goals - Increasing Environmental Quality and Increasing Public Education.

(INTERVIEWER: After R has divided the $10,000 between the first two goals, continue with the other pairs in the same manner.)

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Allocation of Ten Thousand Dollars

1.	Environmental quality	$_____	$_____	Public education
2.	Health care	$_____	$_____	Public education
3.	Environmental quality	$_____	$_____	Health care
4.	Public safety	$_____	$_____	The average family income
5.	Income inequalities	$_____	$_____	Recreation & leisure facilities
6.	The average family income . .	$_____	$_____	Income inequalities
7.	Recreation & leisure facilities	$_____	$_____	Environmental quality
8.	Public safety	$_____	$_____	Income inequalities
9.	The average family income . .	$_____	$_____	Recreation & leisure facilities
10.	Income inequalities	$_____	$_____	Environmental quality
11.	Public safety	$_____	$_____	Recreation & leisure facilities
12.	The average family income . .	$_____	$_____	Environmental quality
13.	Income inequalities	$_____	$_____	Health care
14.	Recreation & leisure facilities	$_____	$_____	Public education
15.	Public safety	$_____	$_____	Environmental quality
16.	The average family income . .	$_____	$_____	Health care
17.	Public safety	$_____	$_____	Public education
18.	Recreation & leisure facilities	$_____	$_____	Health care
19.	The average family income . .	$_____	$_____	Public education
20.	Public safety	$_____	$_____	Health care
21.	Income inequalities	$_____	$_____	Public education

SECTION III

(INTERVIEWER: Hand R the GREEN card)

3. On the left side of this green card we have listed again the seven community goals we've been talking about. On the right side are listed several issues or problems in your community relating to each of the seven goals. There may be other issues or problems of importance which you think need attention. The first goal we have listed is Increasing Public Safety. We have listed two possible issues or problems: (1) Prevent monitoring of police calls and (2) Provide country-wide emergency communications system.

(a) Can you think of any other issues or problems connected with Increasing Public Safety?

(INTERVIEWER: Record issues or problems listed by R on additional lines provided. Probe: "Any others?")

(b) Now, considering both the problems you have identified and the ones we had listed, would you please tell me which you think is the <u>most important</u> issue or problem?

(INTERVIEWER: Enter 1 in Col. (b) for category named.)

What do you consider to be the second most important issue? (Enter 2 in Col. b)

Which issue do you consider to be the third most important? (Enter 3 in Col. b)

(INTERVIEWER: Continue in the same manner for issues or problems connected with each goal, ranking each set, until you have completed the seven goals.)

Goal	(b) Rank	(a) Issue or problem
1 Increasing public safety	____	(a) Prevent monitoring of police calls
	____	(b) Provide county-wide emergency communications system
	____	(c) _____
	____	(d) _____
	____	(e) _____
2 Increasing the average family income	____	(a) Build airport to provide more jobs
	____	(b) Bring new small industries to town
	____	(c) Provide jobs for young people
	____	(d) _____
	____	(e) _____
	____	(f) _____
3 Reducing income inequalities	____	(a) _____
	____	(b) _____
	____	(c) _____
4 Increasing recreation and leisure facilities	____	(a) Provide competitive standard tennis court
	____	(b) Provide youth facilities
	____	(c) _____
	____	(d) _____
	____	(e) _____
5 Increasing environmental quality	____	(a) Improve the streets and sidewalks in the business district
	____	(b) _____
	____	(c) _____
	____	(d) _____

Goal	(b) Rank	(a) Issue or problem
6 Increasing health care	____ (a)	Recruit more doctors for hospital
	____ (b)	Continue provision of local hospital facilities
	____ (c)	_____
	____ (d)	_____
	____ (e)	_____
7 Increasing public education	____ (a)	_____
	____ (b)	_____
	____ (c)	_____

SECTION IV

That completes the questions regarding your community. In closing, we would like to ask a few questions regarding the members of your household?

1. How many people are there in your household? _____

2. (a) In addition to you (and your spouse), would you give me the first names of the other members of your household?

   (b) How old was he/she on his/her last birthday?

INTERVIEWER: For all members 18 and over, ask:

   (c) What is the highest grade of schooling he/she completed?

   (d) What is _____'s occupation - what kind of work does he/she do? (If retired, what was his/her main job prior to retirement?)

	(a)	(b)	(c)	(d)		
	Person	Age	Highest grade completed	Occupation	Retired? Yes	No
1.	Head					
2.	Spouse					
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

3. How long have you lived in this community?

_____ All my life

_____ Years ⟶ (a) Where did you live before? _____ (town) _____ (state)

(b) Why did you move here? _____

_____

(INTERVIEWER: Hand R the PINK card)

4. On this card we have listed some broad income categories. Would you look at this card and tell me which letter most closely represents the total income of the members of this household for the year 1974. Please include all the income of every member, including wages, interest, dividends, public assistance, unemployment compensation, net income from business, etc., before taxes.

_____ A. $ 000 - $ 2,999
_____ B. $ 3,000 - $ 6,999
_____ C. $ 7,000 - $12,999
_____ D. $13,000 - $19,999
_____ E. $20,000 - $29,999
_____ F. $30,000 - $99,999

Ending time _____

SECTION I

These community goals we've been talking about affect you and all the people in your community. Your community uses its resources to improve these goals so that you and other members of the community can enjoy them more. Unfortunately, community resources are limited, and choices have to be made: how much to spend on health care, how much to spend on education, and so on. Now we want to discuss how you would allocate your community's resources. (INTERVIEWER: Hand R the set of WHITE goal-pair cards)

Listed on each of these cards are two of the community goals. For example, on the first card the two goals are Increasing Environmental Quality and Increasing Public Education. Now suppose an additional one dollar of community resources is going to be spent on these two goals. Community resources includes money spent by groups such as churches, local volunteer groups and the Chamber of Commerce as well as taxes collected by the community.

We want to know how you would divide this one dollar between the two goals. Please note, we are asking for your own preferences as to how you would allocate (divide) this additional dollar. Don't consider what others might say or think. We want your own preference. If you feel that one goal is much more important than the other, you could spend the entire dollar on it, leaving nothing for the other goal. On the other hand, if the goal is only somewhat more important than the other, you might spend, say, 70¢ on it and spend the remaining 30¢ on the lesser important goal. If you think both goals are about equal in importance, you might spend 50¢ on one and 50¢ on the other. In other words, the amount you think should be spent on one goal, relative to the other, indicates the relative worth or importance of the two goals to you.

I might point out that since one dollar is only a small increase in the community's resources now being spent, the way in which you choose to spend it on each pair of goals won't change the present situation of those two goals in the community very much.

Do you have the idea now? Fine, let's try the first pair of goals.

Now turn to the next card and let's think about the next pair of goals. How would you divide the additional dollar between these two goals?

SECTION II

We have been talking about dividing one additional dollar between different pairs of goals. Now, thinking of the same seven community goals and assuming your community had an additional $10,000 of resources, we want to know how you would divide this $10,000 between each pair of goals. As before, community resources includes money spent by groups such as churches, local volunteer groups and the Chamber of Commerce as well as taxes collected by your community.

The amount now is a much larger increase in the amount spent by the community and could perhaps make significant changes in the present situation regarding each pair of goals.

Again, we want <u>your own</u> preferences about how the $10,000 should be allocated. Don't consider what other people might say or think. Please turn back to Card 1 and tell me how <u>you</u> would divide this $10,000 between the first two goals - Increasing Environmental Quality and Increasing Public Education.

INTERVIEWER: After R has divided the $10,000 between the first two goals, continue with the other pairs in the same manner.

APPENDIX 5B: SURVEY PRE-TEST

A preliminary version of the survey was developed and tested in Ames, Iowa (population 39,505). An interviewer was supplied with a sample list of households drawn from the Ames telephone directory. Many persons on the list were unwilling or too busy to be interviewed - particularly some of the subjects who were students taking final examinations. In addition the survey period included one weekend - Mother's Day - during which nobody was available.

Of the 22 persons interviewed, six were university employees and four were students. Mean income was higher than one would expect in a small Iowa town, and thus in order to obtain responses from a more representative sample, the interviewer was sent to Stratford, Iowa (population 710). The purpose of the test was not to conduct a complete experimental design study but principally to test the ease with which respondents were able to complete the questionnaire. In order to obtain a wider range of socio-economic backgrounds the interviewer was asked to choose low-income housing. Fourteen Stratford residents were interviewed in this fashion, and attention was paid to their differences in ability to respond.

Problems Encountered.

Several people exhibited some difficulty by the slow speed at which they were able tc respond to the questionnaire, although this was partly due to the fact that most of the questions had to be read to the respondents and were nct printed on reference cards. Others made specific problems known to the interviewer who, where possible, answered such questions. Only two persons reacted negatively to the questionnaire itself, one of whom, after completing the survey, deciding to withdraw his respcnses totally.

Three specific problems which seemed to give several people cause fcr ccncern were:

(a) what was the "real" purpose of the survey, and what would happen to their taxes as a result of it.

(b) some of the wording was phrased to ask a respondent to indicate who she/he "thought the community would prefer" Several respondents said they did not "know what the community thinks".

(c) the most common response was that of feeling incompetent to answer such questions, that these were for experts to answer.

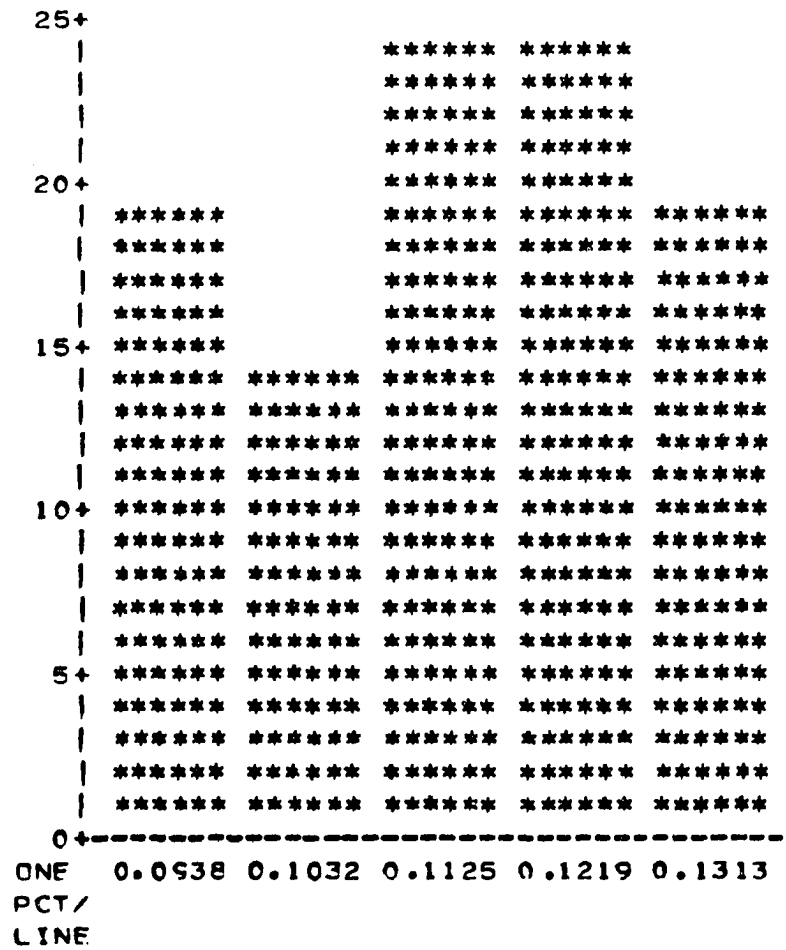
On the basis of these and other minor problems, and from the overall reaction to the questionnaire, modifications were made to the wording and design of the

questionnaire. Substantial assistance and advice in the preparation of the final version was also provided by the Survey Section of the Statistical Laboratory at Iowa State University.

APPENDIX 6:

HISTOGRAMS OF THE STANDARD DEVIATIONS OF RESPONSES 21 GCAL PAIRS

HISTOGRAM FOR A



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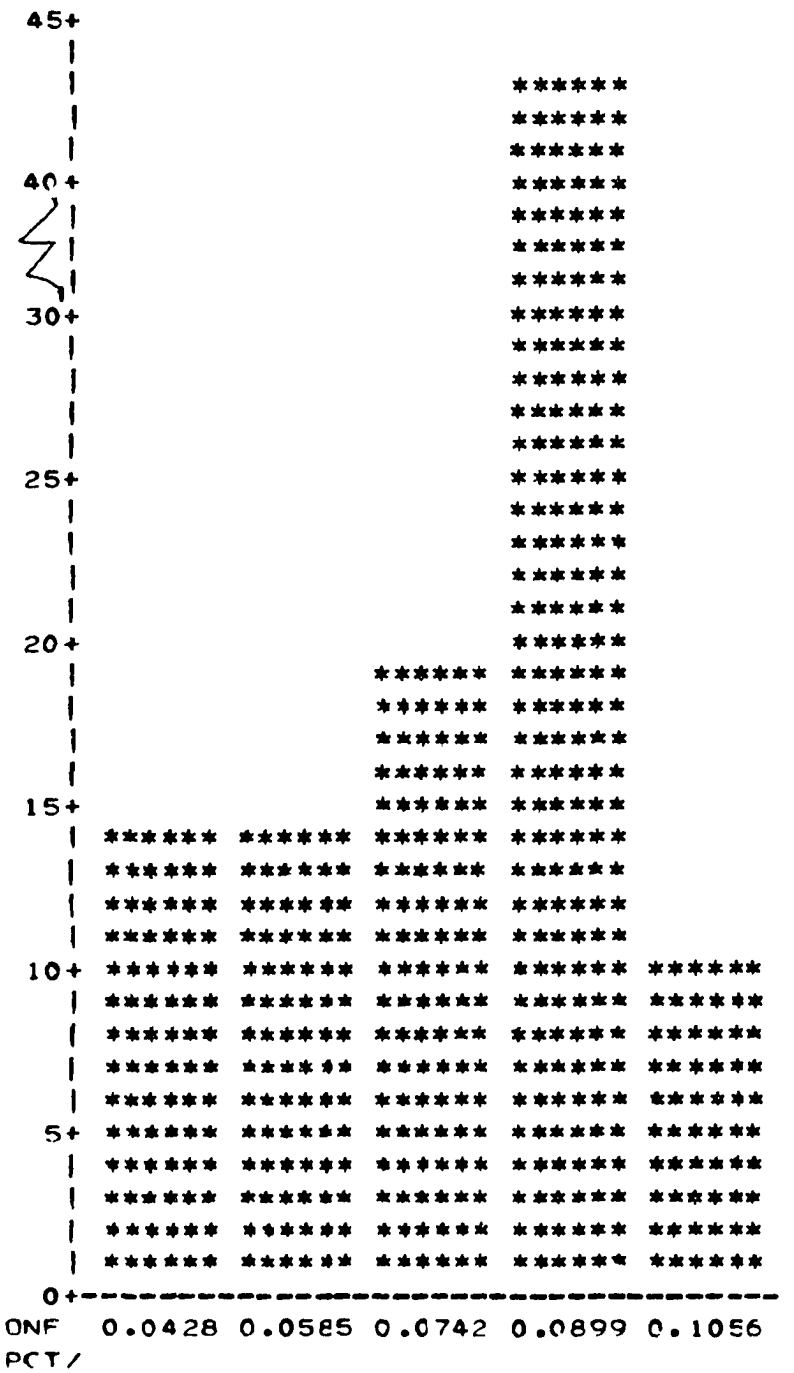

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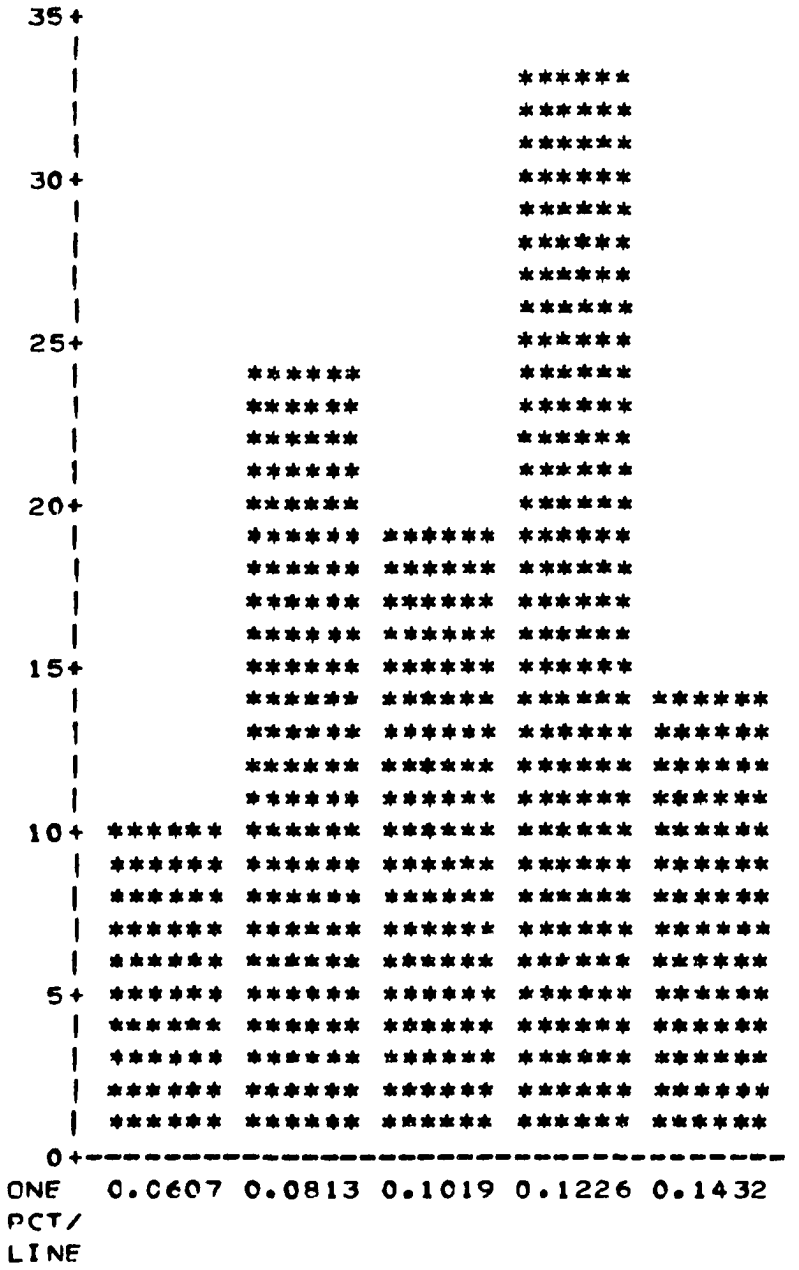

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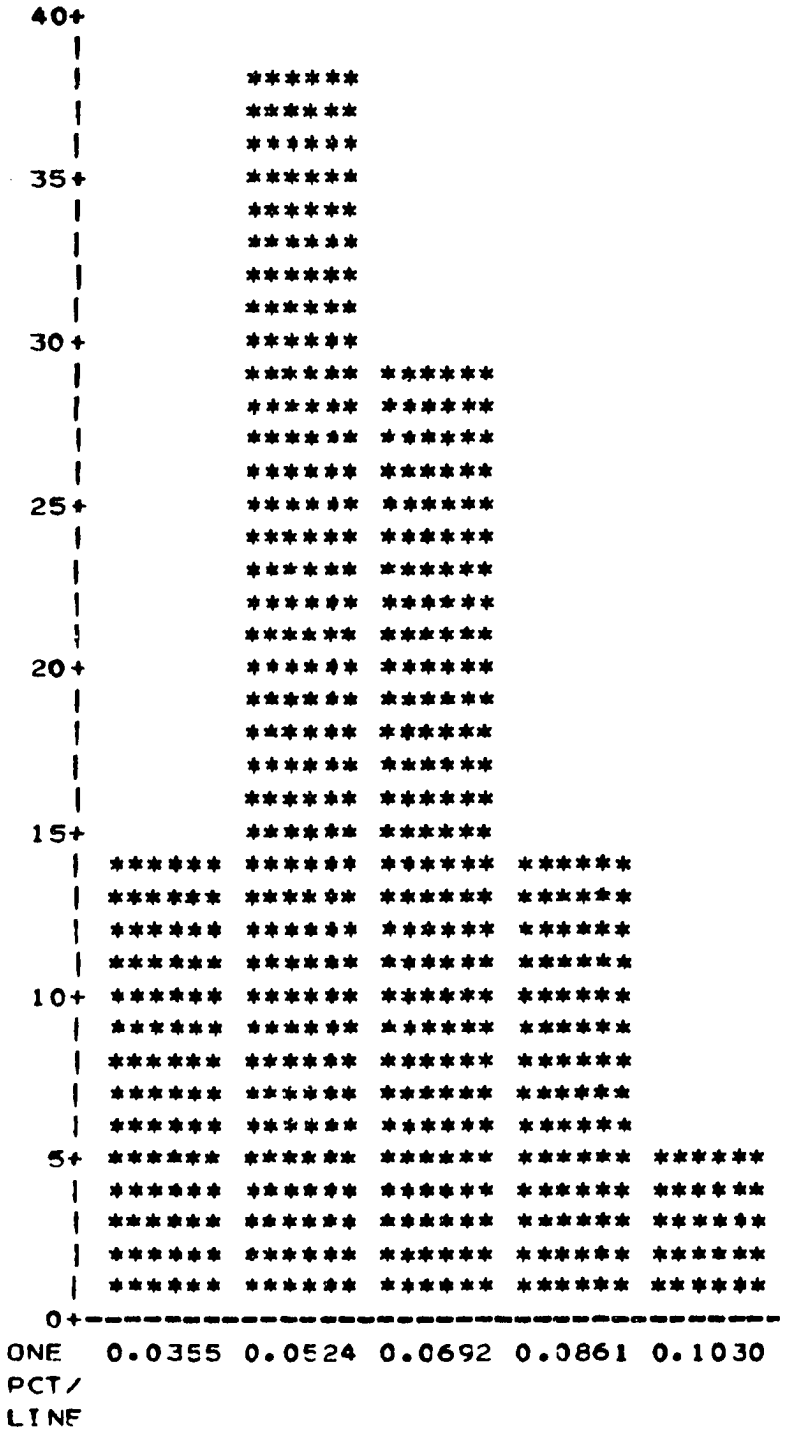

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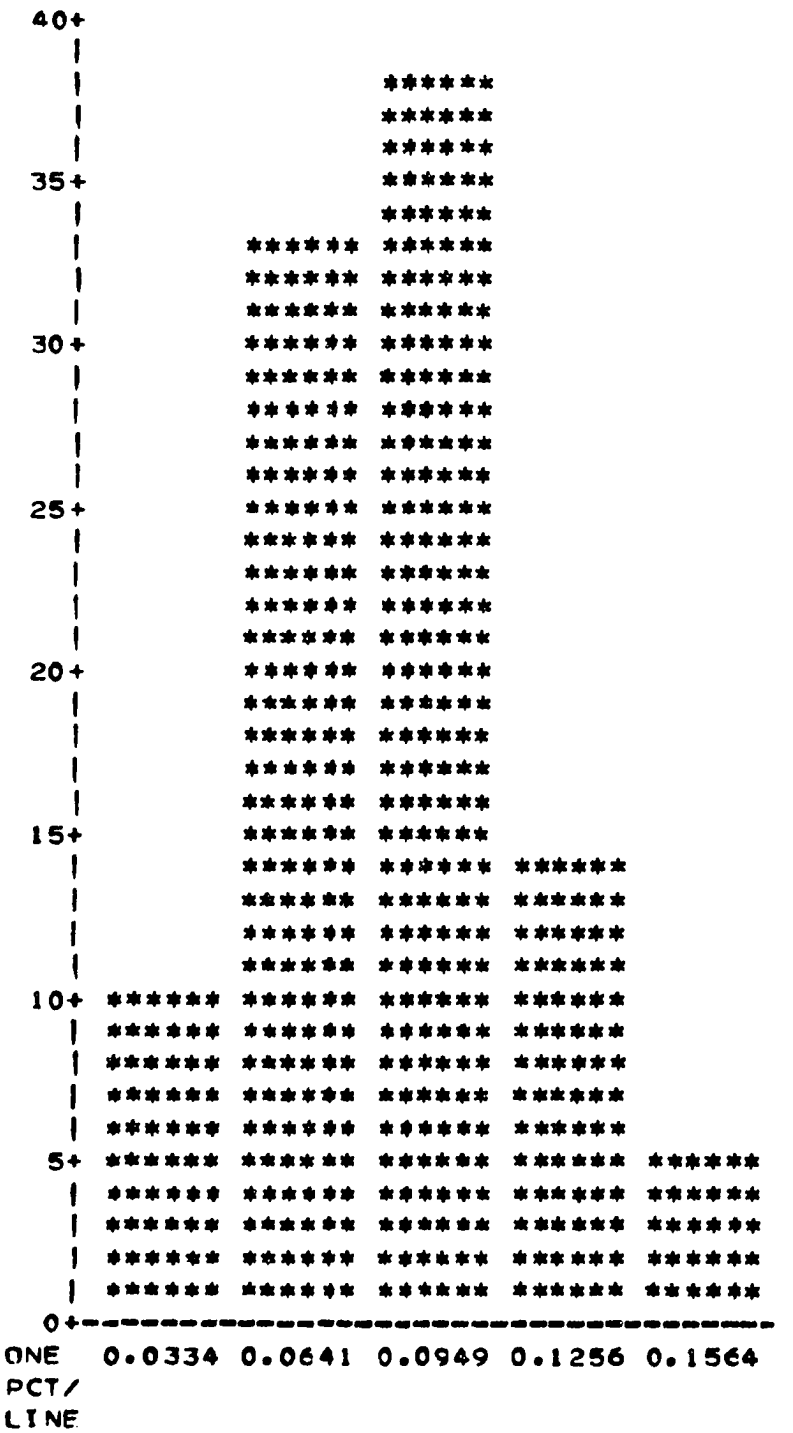

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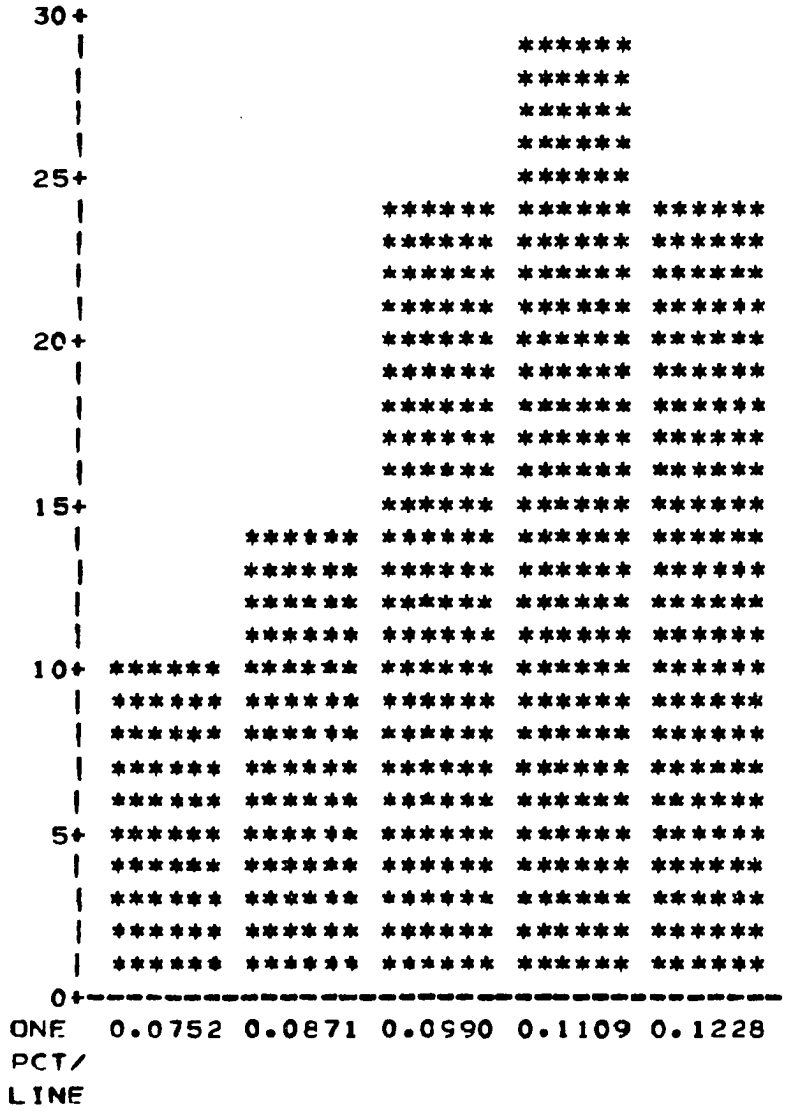

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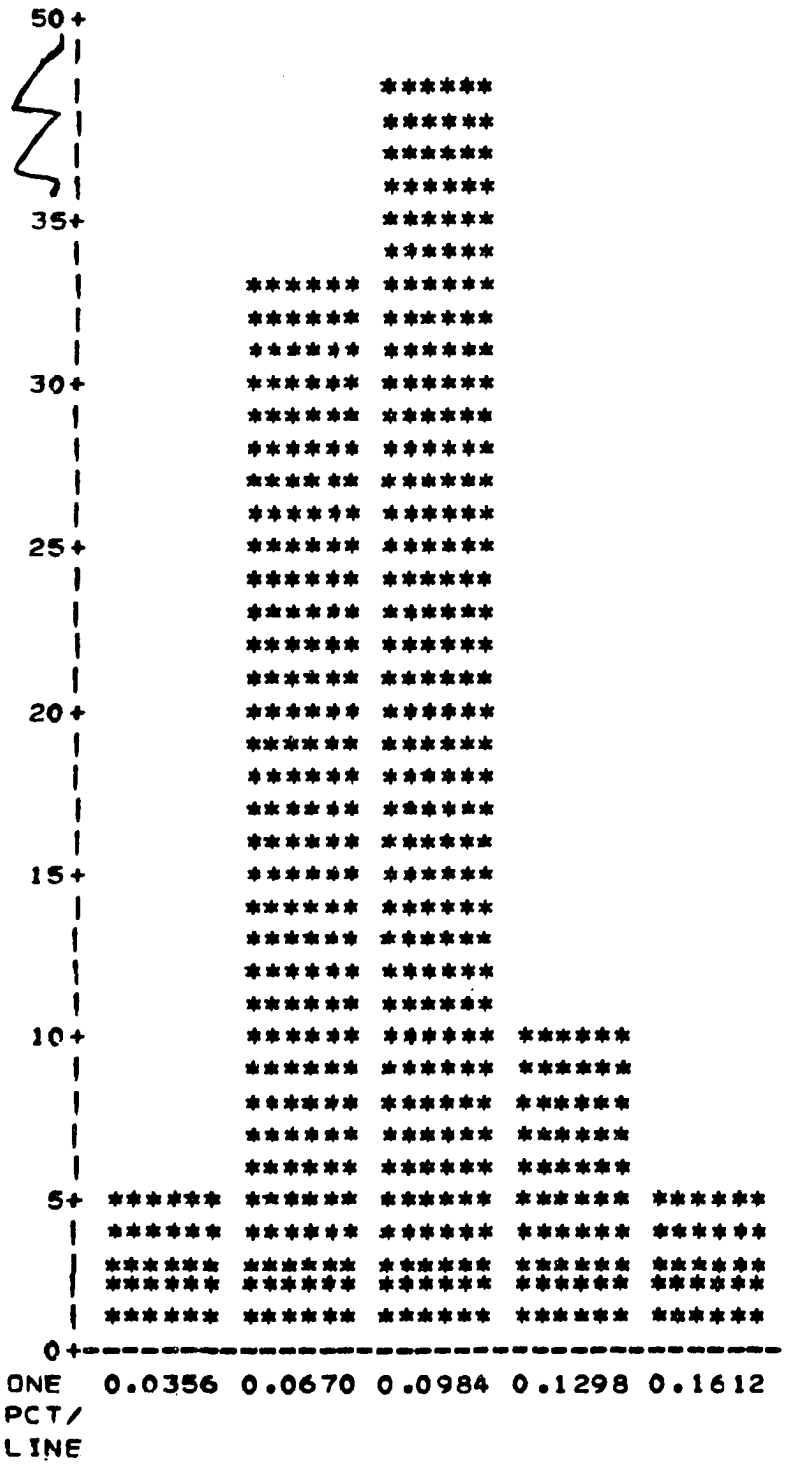

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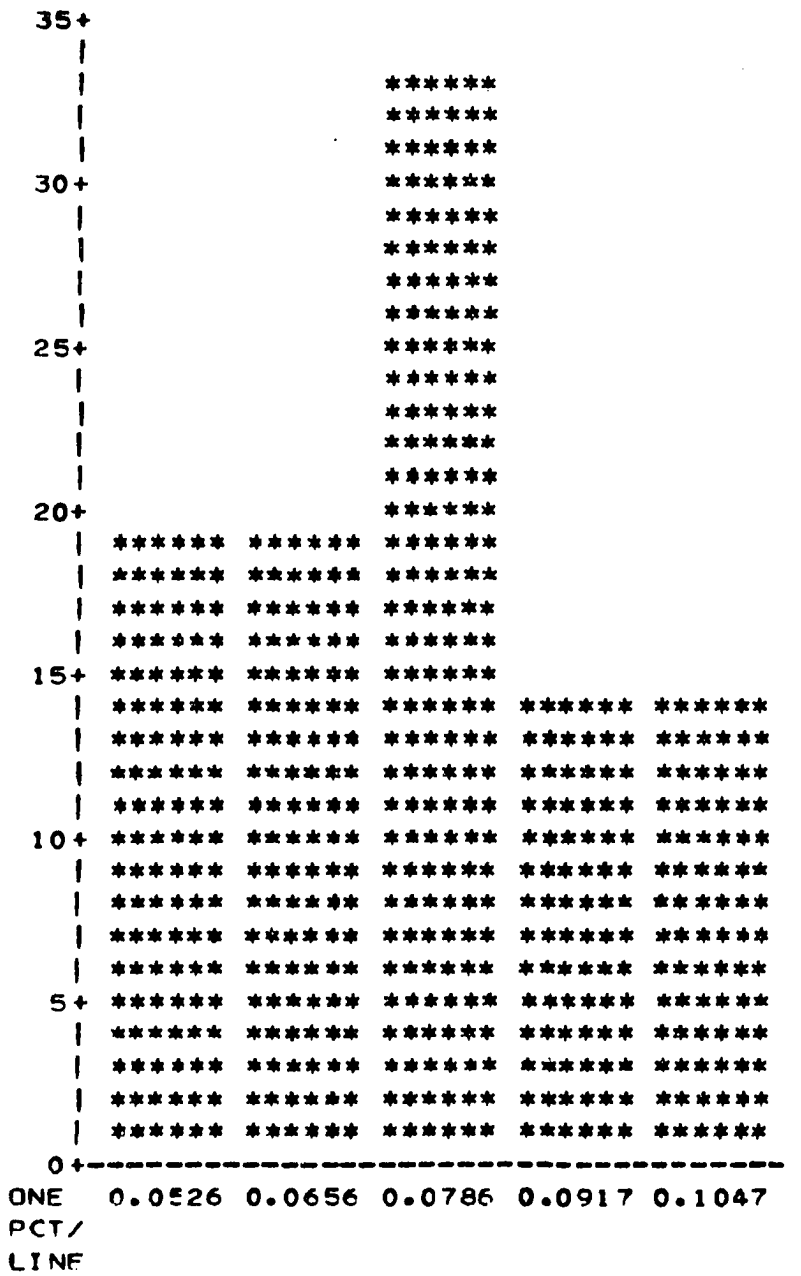

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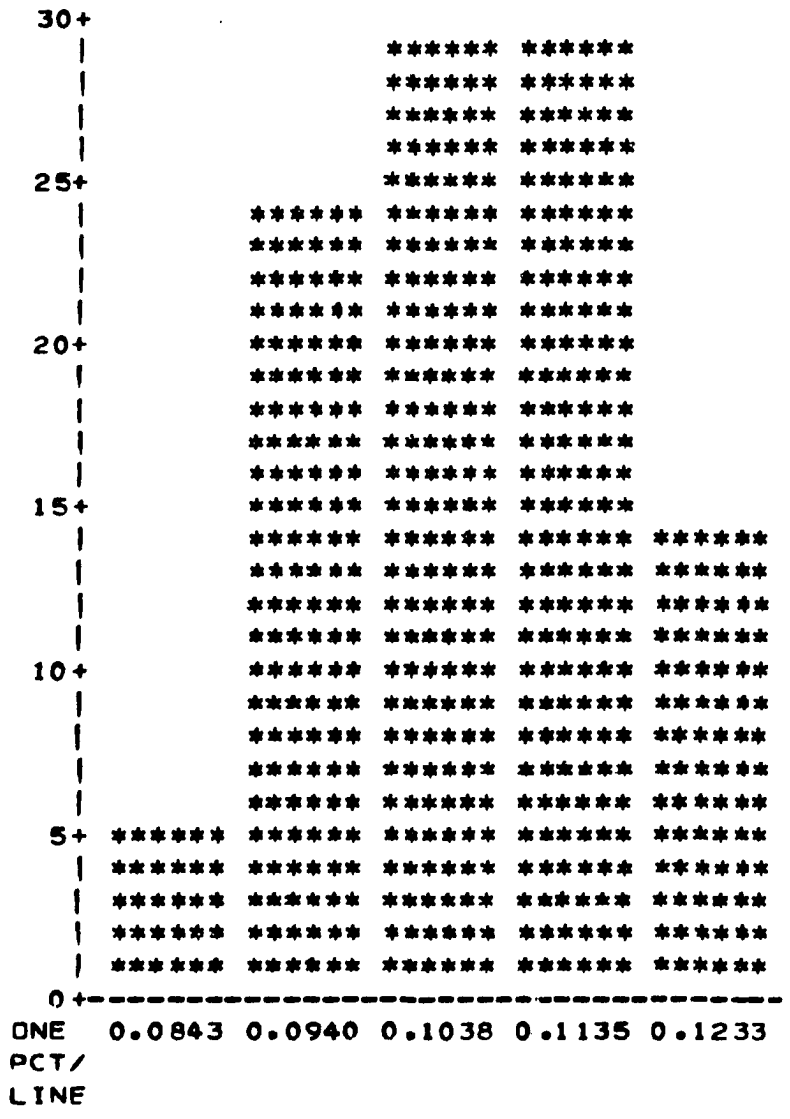

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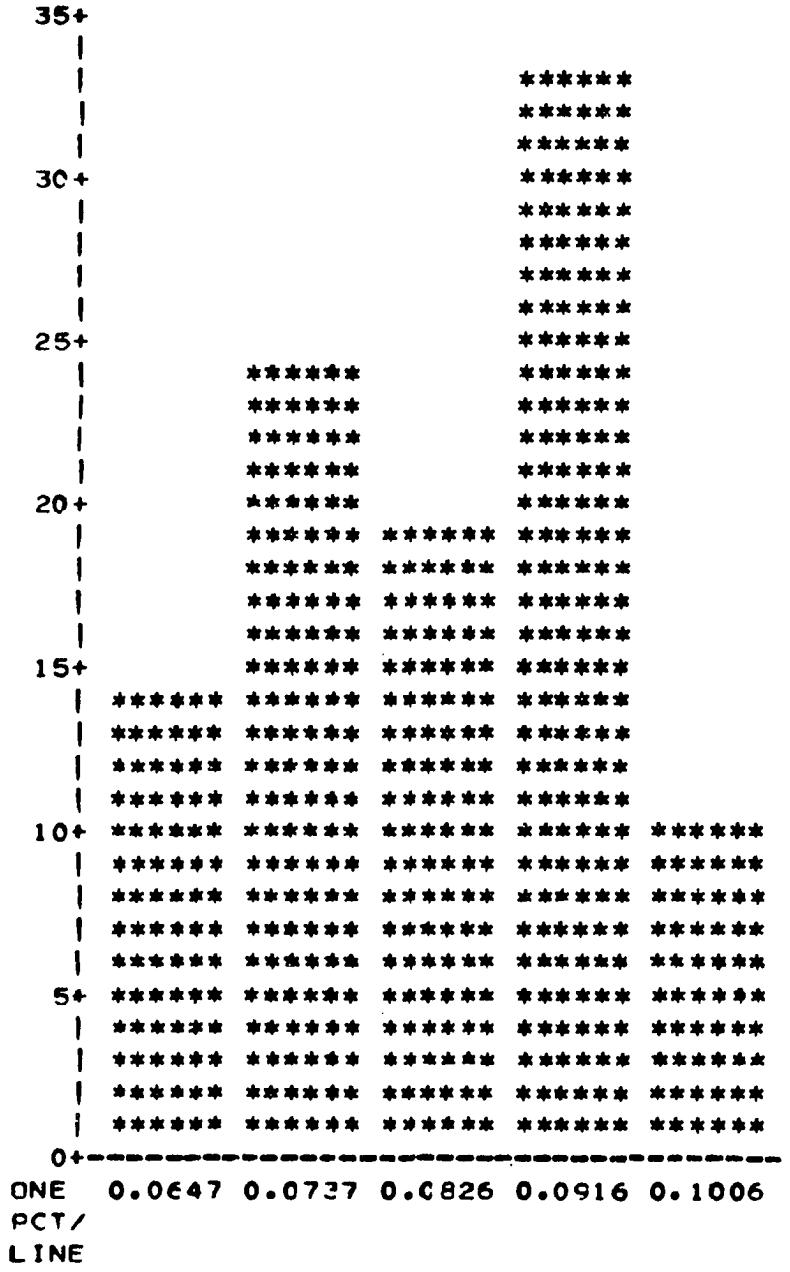

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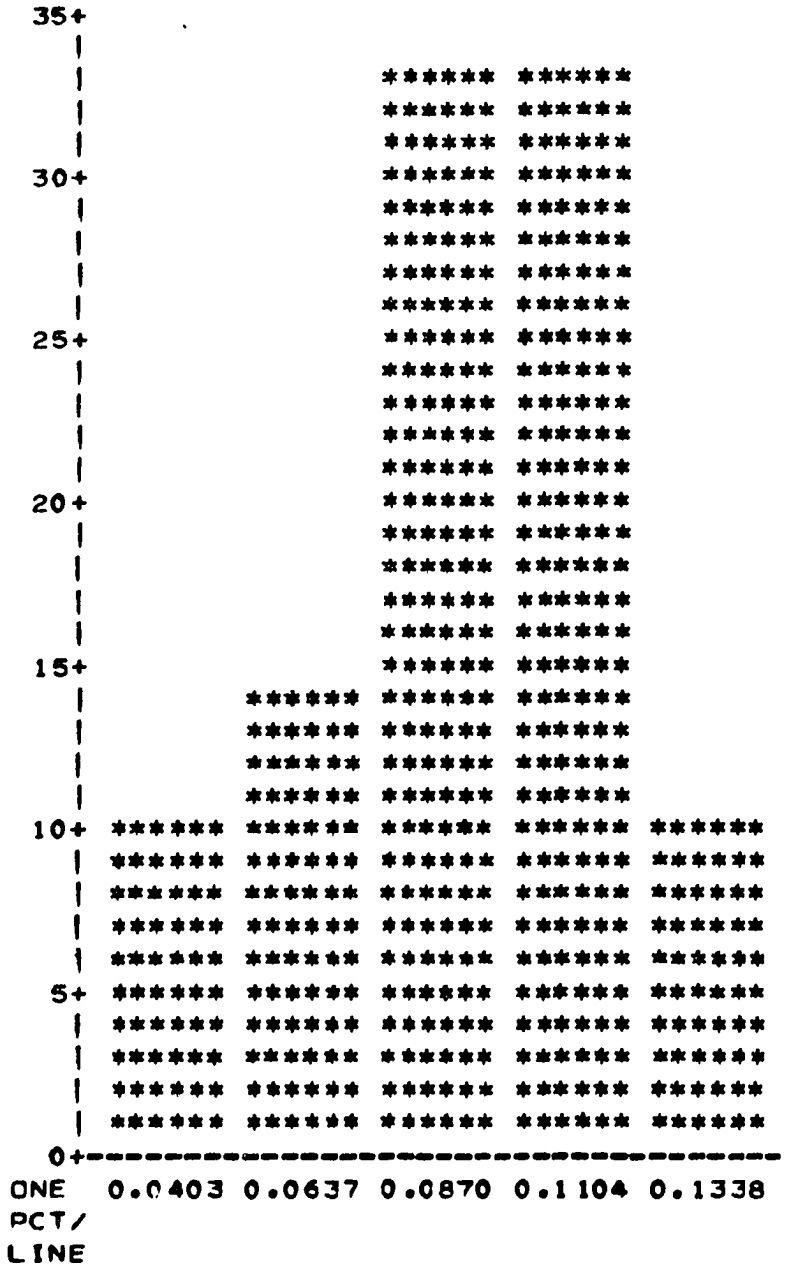

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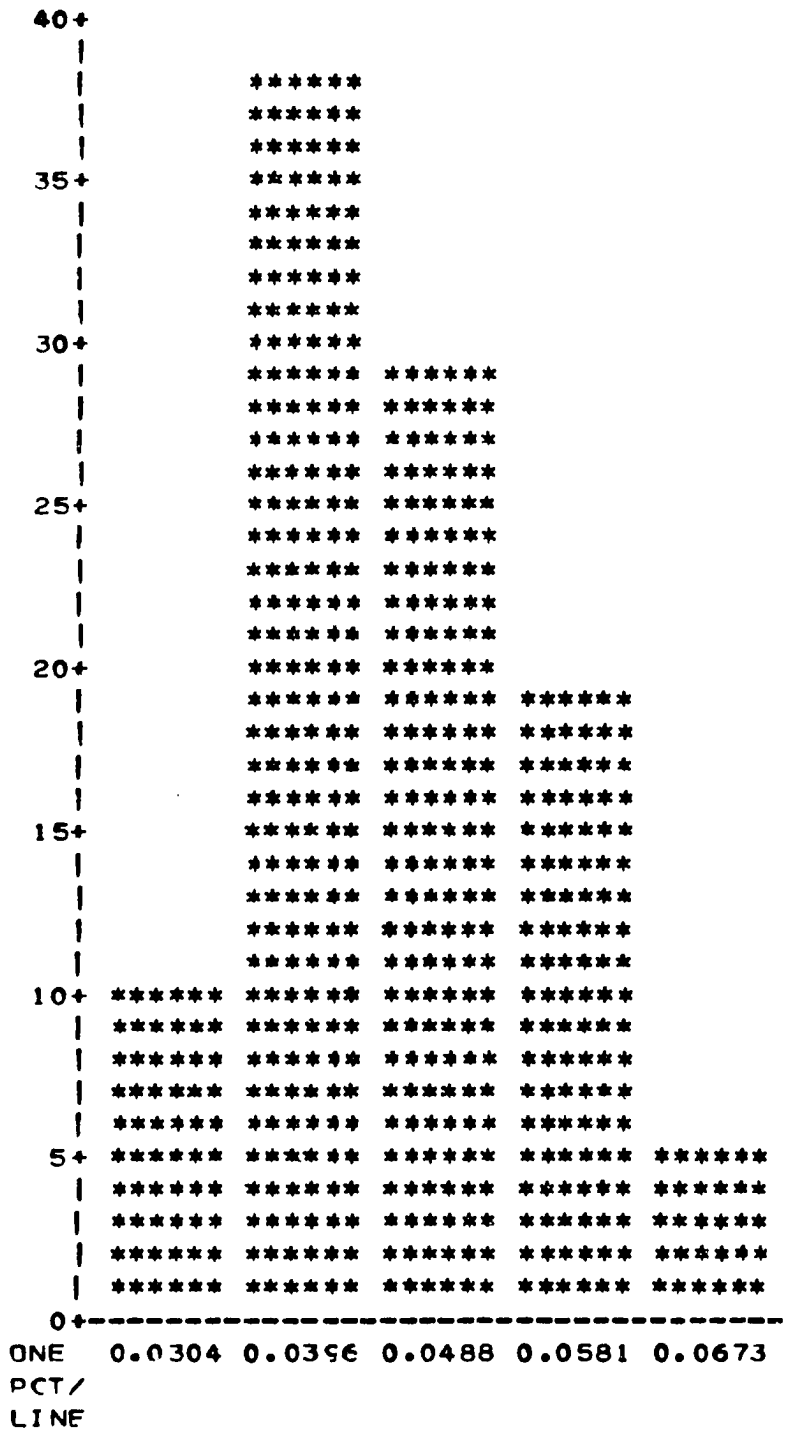

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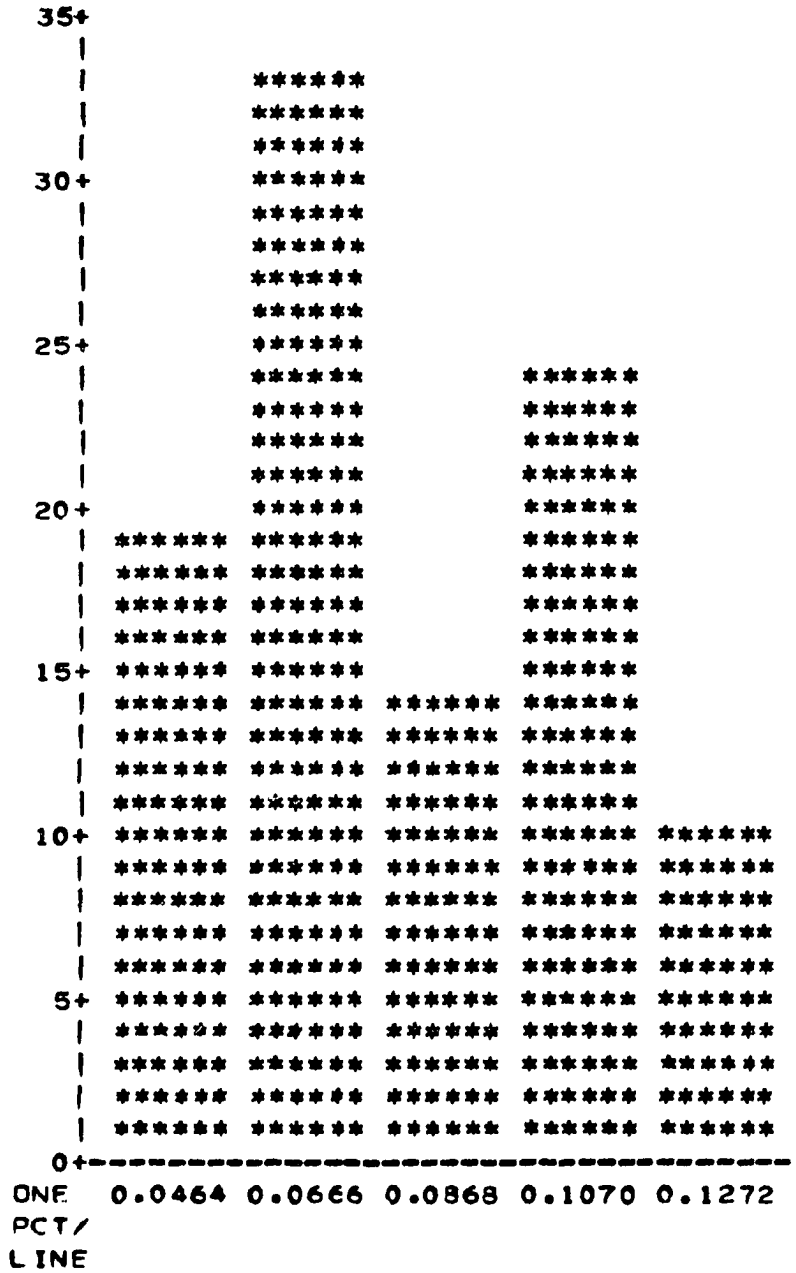
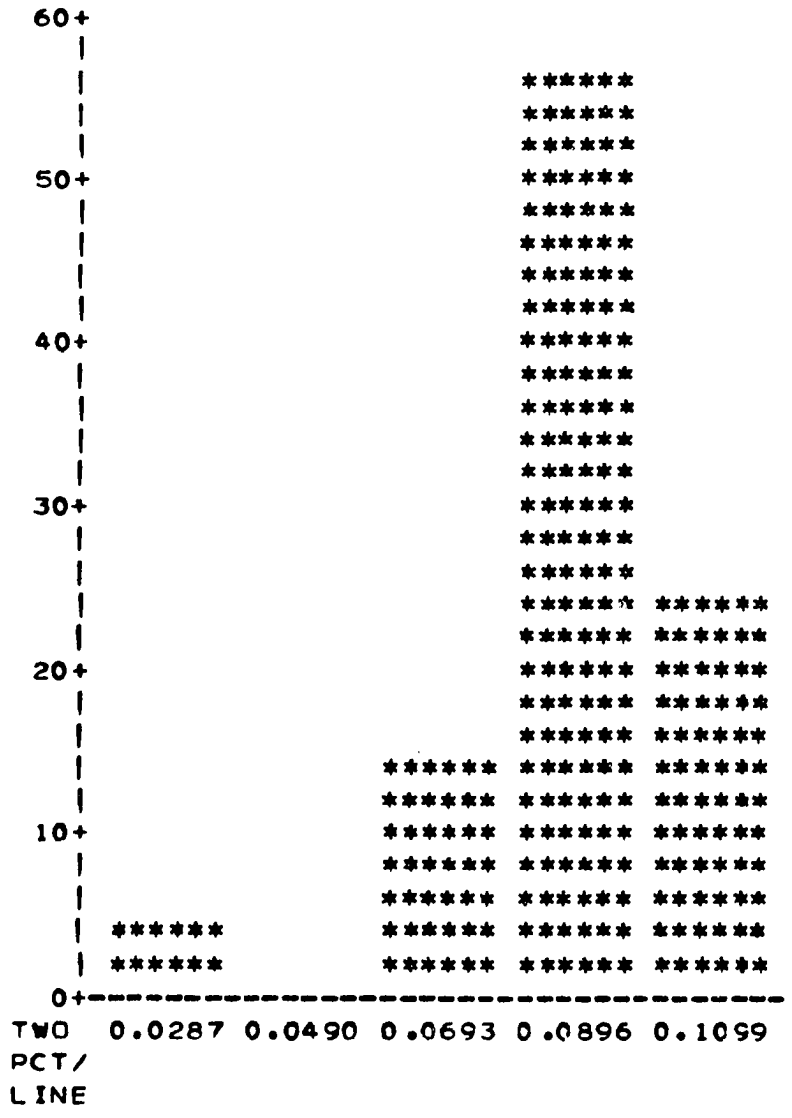
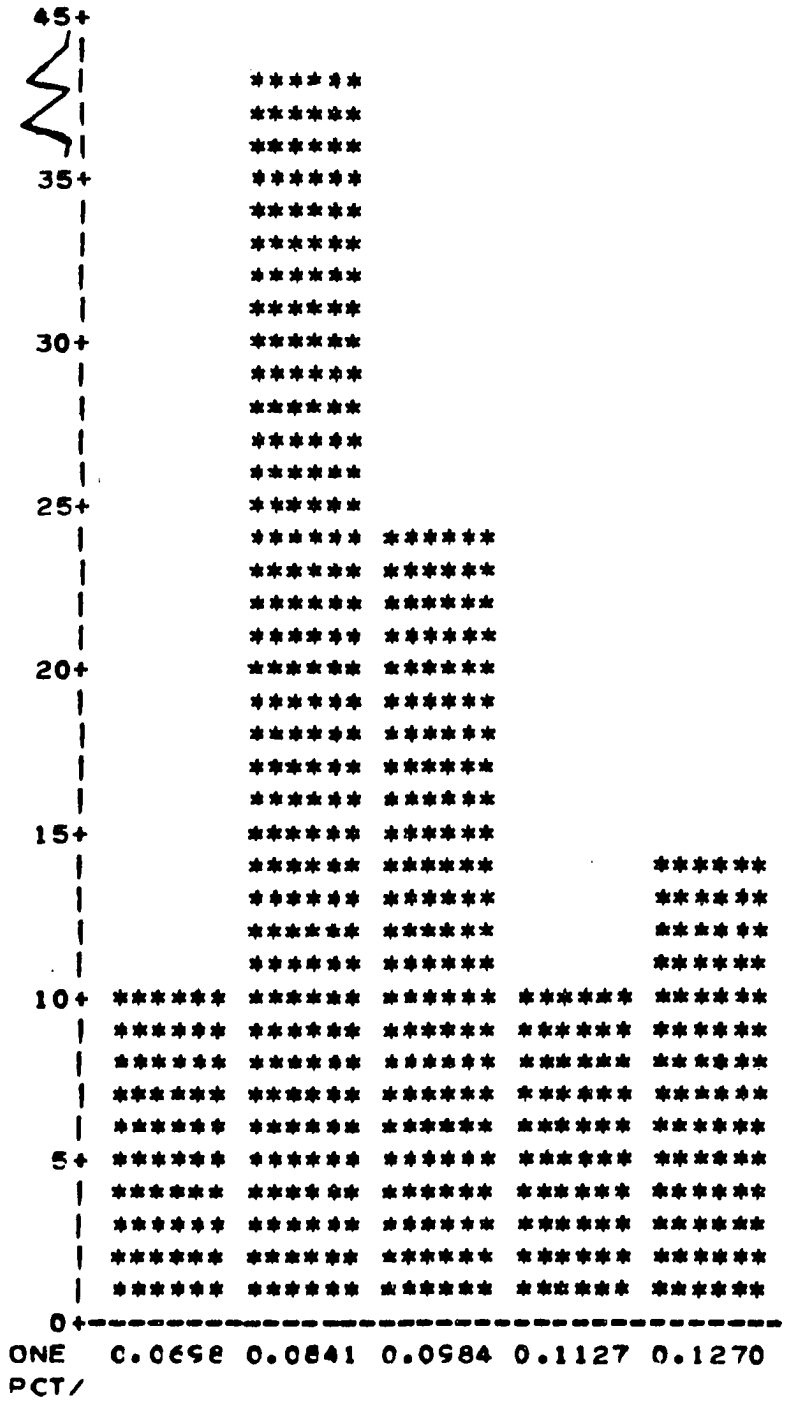


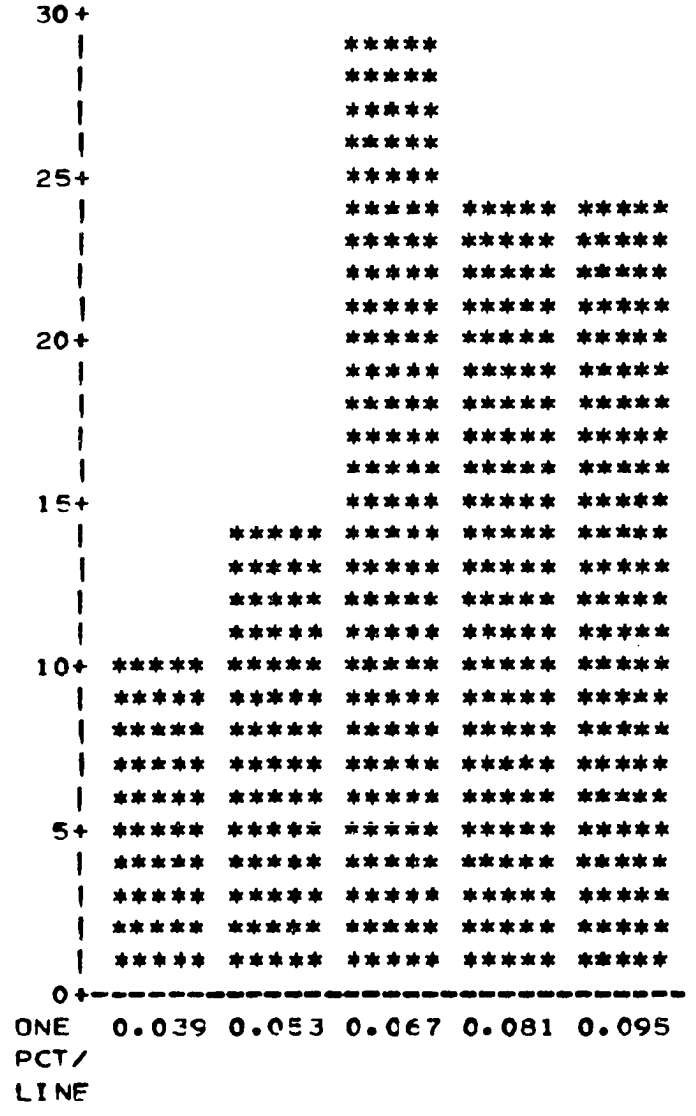
HISTOGRAM FOR N



HISTOGRAM FOR O



HISTOGRAM FOR P



APPENDIX 7:

FREQUENCY DISTRIBUTIONS OF PAIRED COMPARISONS RESPONSES

Pella

AB	FREQUENCY	PERCENT
0.0	17	6.204
0.10500000	3	1.095
0.14900000	5	1.825
0.16600000	14	5.109
0.18100000	5	1.825
0.20800000	11	4.015
0.23300000	102	37.226
0.25800000	35	12.774
0.28500000	18	6.569
0.30000000	24	8.759
0.31700000	15	5.474
0.36100000	6	2.190
0.46600000	19	6.934
TOTALS	274	100.000

Pella

AC	FREQUENCY	PERCENT
0.0	32	11.679
0.10500000	1	0.365
0.14900000	13	4.745
0.16600000	19	6.934
0.18100000	25	9.124
0.20800000	18	6.569
0.23300000	124	45.255
0.25800000	6	2.190
0.28500000	11	4.015
0.30000000	9	3.285
0.31700000	6	2.190
0.36100000	2	0.730
0.46600000	8	2.920
TOTALS	274	100.000

Pella

AD	FREQUENCY	PERCENT
0.0	11	4.015
0.10500000	1	0.365
0.14900000	7	2.555
0.16600000	5	1.825
0.18100000	5	1.825
0.19400000	1	0.365
0.20800000	4	1.460
0.23300000	98	35.766
0.25800000	19	6.934
0.28500000	31	11.314
0.30000000	30	10.949
0.31700000	25	9.124
0.36100000	8	2.920
0.46600000	29	10.584
TOTALS	274	100.000

Pella

AE	FREQUENCY	PERCENT
0.0	6	2.190
0.10500000	2	0.730
0.14900000	4	1.460
0.16600000	18	6.569
0.18100000	8	2.920
0.20800000	14	5.109
0.23300000	117	42.701
0.25800000	16	5.839
0.28500000	19	6.934
0.30000000	26	9.489
0.31700000	16	5.839
0.33700000	1	0.365
0.36100000	1	0.365
0.46600000	26	9.489
TOTALS	274	100.000

Pella

AF	FREQUENCY	PERCENT
0.0	36	13.139
0.10500000	5	1.825
0.14900000	21	7.664
0.16600000	27	9.854
0.18100000	20	7.299
0.19400000	2	0.730
0.20800000	19	6.934
0.23300000	78	28.467
0.25800000	10	3.650
0.27200000	2	0.730
0.28500000	10	3.650
0.30000000	25	9.124
0.31700000	3	1.095
0.36100000	2	0.730
0.46600000	14	5.109
TOTALS	274	100.000

Pella

AG	FREQUENCY	PERCENT
0.0	19	6.934
0.14900000	5	1.825
0.16600000	19	6.934
0.18100000	15	5.474
0.19400000	1	0.365
0.20800000	18	6.569
0.23300000	150	54.745
0.25800000	14	5.109
0.28500000	7	2.555
0.30000000	9	3.285
0.31700000	5	1.825
0.33700000	1	0.365
0.46600000	11	4.015
TOTALS	274	100.000

Pella

BC	FREQUENCY	PERCENT
0.0	11	4.015
0.10500000	2	0.730
0.14900000	4	1.460
0.16600000	20	7.299
0.18100000	15	5.474
0.19400000	1	0.365
0.20800000	12	4.380
0.23300000	103	37.591
0.25800000	15	5.474
0.27200000	1	0.365
0.28500000	13	4.745
0.30000000	25	9.124
0.31700000	14	5.109
0.36100000	7	2.555
0.46600000	31	11.314
TOTALS	274	100.000

Pella

BD	FREQUENCY	PERCENT
0.0	21	7.664
0.10500000	3	1.095
0.14900000	4	1.460
0.16600000	25	9.124
0.18100000	9	3.285
0.19400000	1	0.365
0.20800000	13	4.745
0.23300000	105	38.321
0.25800000	24	8.759
0.27200000	1	0.365
0.28500000	22	8.029
0.30000000	18	6.569
0.31700000	10	3.650
0.46600000	18	6.569
TOTALS	274	100.000

Pella

BE	FREQUENCY	PERCENT
0.0	39	14.234
0.10500000	6	2.190
0.14900000	30	10.949
0.16600000	30	10.949
0.18100000	19	6.934
0.19400000	3	1.095
0.20800000	21	7.664
0.23300000	92	33.577
0.25800000	11	4.015
0.28500000	6	2.190
0.30000000	9	3.285
0.31700000	5	1.825
0.46600000	3	1.095
TOTALS	274	100.000

Pella

BF	FREQUENCY	PERCENT
0.0	19	6.934
0.10500000	5	1.825
0.14900000	13	4.745
0.16600000	19	6.934
0.18100000	17	6.204
0.19400000	1	0.365
0.20800000	23	8.394
0.23300000	111	40.511
0.25800000	12	4.380
0.27200000	2	0.730
0.28500000	12	4.380
0.30000000	17	6.204
0.31700000	9	3.285
0.46600000	14	5.109
TOTALS	274	100.000

Pella

BG	FREQUENCY	PERCENT
0.0	29	10.584
0.10500000	1	0.365
0.14900000	18	6.569
0.16600000	26	9.489
0.18100000	22	8.029
0.20800000	24	8.759
0.23300000	108	39.416
0.25800000	11	4.015
0.27200000	1	0.365
0.28500000	11	4.015
0.30000000	11	4.015
0.31700000	2	0.730
0.33700000	1	0.365
0.46600000	9	3.285
TOTALS	274	100.000

Pella

CD	FREQUENCY	PERCENT
0.0	28	10.219
0.10500000	7	2.555
0.12900000	1	0.365
0.14900000	22	8.029
0.16600000	24	8.759
0.18100000	18	6.569
0.20800000	22	8.029
0.22000000	1	0.365
0.23300000	102	37.226
0.25800000	8	2.920
0.27200000	1	0.365
0.28500000	9	3.285
0.30000000	12	4.380
0.31700000	3	1.095
0.36100000	4	1.460
0.46600000	12	4.380
TOTALS	274	100.000

Pella

CE	FREQUENCY	PERCENT
0.0	3	1.095
0.16600000	9	3.285
0.18100000	2	0.730
0.20800000	11	4.015
0.23300000	128	46.715
0.25800000	27	9.854
0.27200000	2	0.730
0.28500000	12	4.380
0.30000000	38	13.869
0.31700000	8	2.920
0.36100000	5	1.825
0.46600000	29	10.584
TOTALS	274	100.000

Pella

CF	FREQUENCY	PERCENT
C.0	4	1.460
0.14900000	3	1.095
0.16600000	3	1.095
0.20800000	8	2.920
0.23300000	103	37.591
0.25800000	27	9.854
0.27200000	3	1.095
0.28500000	29	10.584
0.30000000	33	12.044
0.31700000	20	7.299
0.33700000	1	0.365
0.36100000	7	2.555
0.46600000	33	12.044
TOTALS	274	100.000

Pella

CG	FREQUENCY	PERCENT
0.0	16	5.839
0.10500000	3	1.095
0.14900000	9	3.285
0.16600000	9	3.285
0.18100000	15	5.474
0.19400000	1	0.365
0.20800000	16	5.839
0.23300000	152	55.474
0.25800000	11	4.015
0.28500000	8	2.920
0.30000000	14	5.109
0.31700000	6	2.190
0.36100000	2	0.730
0.46600000	12	4.380
TOTALS	274	100.000

Pella

DE	FREQUENCY	PERCENT
0.0	10	3.650
0.10500000	2	0.730
0.14900000	2	0.730
0.16600000	15	5.474
0.18100000	4	1.460
0.20800000	13	4.745
0.23300000	133	48.540
0.25800000	27	9.854
0.27200000	2	0.730
0.28500000	12	4.380
0.30000000	27	9.854
0.31700000	9	3.285
0.36100000	7	2.555
0.46600000	11	4.015
TOTALS	274	100.000

Pella

DF	FREQUENCY	PERCENT
0.0	11	4.015
0.10500000	2	0.730
0.14900000	3	1.095
0.16600000	16	5.839
0.18100000	4	1.460
0.19400000	3	1.095
0.20800000	6	2.190
0.23300000	134	48.905
0.25800000	24	8.759
0.27200000	2	0.730
0.28500000	18	6.569
0.30000000	28	10.219
0.31700000	10	3.650
0.36100000	3	1.095
0.46600000	10	3.650
TOTALS	274	100.000

Pella

DG	FREQUENCY	PERCENT
0.0	2	0.730
0.10500000	2	0.730
0.14900000	1	0.365
0.16600000	7	2.555
0.18100000	4	1.460
0.20800000	6	2.190
0.22000000	1	0.365
0.23300000	67	24.453
0.24600000	1	0.365
0.25800000	30	10.949
0.27200000	2	0.730
0.28500000	27	9.854
0.30000000	44	16.058
0.31700000	27	9.854
0.33700000	1	0.365
0.36100000	6	2.190
0.46600000	46	16.788
TOTALS	274	100.000

Pella

EF	FREQUENCY	PERCENT
0.0	16	5.839
0.10500000	1	0.365
0.14900000	12	4.380
0.16600000	16	5.839
0.18100000	9	3.285
0.19400000	2	0.730
0.20800000	14	5.109
0.23300000	134	48.905
0.25800000	12	4.380
0.27200000	1	0.365
0.28500000	11	4.015
0.30000000	21	7.664
0.31700000	13	4.745
0.36100000	3	1.095
0.46600000	9	3.285
TOTALS	274	100.000

Pella

EG	FREQUENCY	PERCENT
0.0	2	0.730
0.14900000	1	0.365
0.16600000	4	1.460
0.18100000	4	1.460
0.19400000	1	0.365
0.20800000	7	2.555
0.23300000	138	50.365
0.25800000	34	12.409
0.27200000	1	0.365
0.28500000	12	4.380
0.30000000	32	11.679
0.31700000	17	6.204
0.36100000	4	1.460
0.46600000	17	6.204
TOTALS	274	100.000

Pella

FG	FREQUENCY	PERCENT
0.0	12	4.380
0.14900000	9	3.285
0.16600000	14	5.109
0.18100000	2	0.730
0.19400000	4	1.460
0.20800000	12	4.380
0.23300000	129	47.080
0.25800000	15	5.474
0.27200000	2	0.730
0.28500000	18	6.569
0.30000000	26	9.489
0.31700000	8	2.920
0.33700000	1	0.365
0.36100000	1	0.365
0.46600000	21	7.664
TOTALS	274	100.000

West Union

AB	FREQUENCY	PERCENT
0.0	9	6.818
0.10500000	1	0.758
0.14900000	3	2.273
0.16600000	9	6.818
0.18100000	8	6.061
0.20800000	9	6.818
0.23300000	61	46.212
0.25800000	4	3.030
0.28500000	4	3.030
0.30000000	9	6.818
0.31700000	5	3.788
0.33700000	1	0.758
0.36100000	4	3.030
0.46600000	5	3.788
TOTALS	132	100.000

West Union

AC	FREQUENCY	PERCENT
0.0	13	9.848
0.10500000	1	0.758
0.12900000	1	0.758
0.14900000	1	0.758
0.16600000	14	10.606
0.18100000	3	2.273
0.20800000	12	9.091
0.23300000	74	56.061
0.25800000	3	2.273
0.28500000	1	0.758
0.30000000	1	0.758
0.31700000	2	1.515
0.46600000	6	4.545
TOTALS	132	100.000

West Union

AD	FREQUENCY	PERCENT
0.0	6	4.545
0.14900000	1	0.758
0.16600000	5	3.788
0.18100000	5	3.788
0.20800000	10	7.576
0.23300000	53	40.152
0.25800000	10	7.576
0.28500000	5	3.788
0.30000000	15	11.364
0.31700000	7	5.303
0.33700000	1	0.758
0.36100000	3	2.273
0.46600000	11	8.333
TOTALS	132	100.000

West Union

AE	FREQUENCY	PERCENT
0.0	5	3.788
0.16600000	3	2.273
0.18100000	2	1.515
0.20800000	7	5.303
0.23300000	67	50.758
0.25800000	6	4.545
0.27200000	1	0.758
0.27700000	1	0.758
0.28500000	9	6.818
0.30000000	11	8.333
0.31700000	5	3.788
0.36100000	3	2.273
0.46600000	12	9.091
TOTALS	132	100.000

West Union

AF	FREQUENCY	PERCENT
0.0	12	9.091
0.10500000	3	2.273
0.14900000	10	7.576
0.16600000	26	19.697
0.18100000	11	8.333
0.20800000	15	11.364
0.23300000	27	20.455
0.25800000	3	2.273
0.28500000	1	0.758
0.30000000	5	3.788
0.31700000	4	3.030
0.36100000	1	0.758
0.46600000	14	10.606
TOTALS	132	100.000

West Union

AG	FREQUENCY	PERCENT
0.0	18	13.636
0.10500000	2	1.515
0.14900000	4	3.030
0.16600000	17	12.879
0.18100000	6	4.545
0.19400000	1	0.758
0.20800000	13	9.848
0.23300000	59	44.697
0.25800000	1	0.758
0.28500000	2	1.515
0.30000000	1	0.758
0.31700000	2	1.515
0.36100000	2	1.515
0.46600000	4	3.030
TOTALS	132	100.000

West Union

BC	FREQUENCY	PERCENT
0.0	2	1.515
0.10500000	2	1.515
0.14900000	6	4.545
0.16600000	8	6.061
0.18100000	4	3.030
0.20800000	3	2.273
0.23300000	65	49.242
0.25800000	10	7.576
0.27200000	2	1.515
0.28500000	5	3.788
0.30000000	11	8.333
0.31700000	6	4.545
0.33700000	2	1.515
0.46600000	6	4.545
TOTALS	132	100.000

West Union

BD	FREQUENCY	PERCENT
0.0	21	15.909
0.10500000	1	0.758
0.14900000	3	2.273
0.16600000	14	10.606
0.18100000	5	3.788
0.19400000	1	0.758
0.20800000	25	18.939
0.23300000	41	31.061
0.25800000	6	4.545
0.27700000	1	0.758
0.28500000	8	6.061
0.30000000	1	0.758
0.31700000	1	0.758
0.46600000	4	3.030
TOTALS	132	100.000

West Union

BE	FREQUENCY	PERCENT
0.0	20	15.152
0.10500000	3	2.273
0.14900000	13	9.848
0.16600000	24	18.182
0.18100000	10	7.576
0.19400000	1	0.758
0.20800000	13	9.848
0.23300000	39	29.545
0.25800000	3	2.273
0.28500000	1	0.758
0.30000000	1	0.758
0.46600000	4	3.030
TOTALS	132	100.000

West Union

BF	FREQUENCY	PERCENT
0.0	4	3.030
0.10500000	1	0.758
0.12900000	1	0.758
0.14900000	5	3.788
0.16600000	12	9.091
0.18100000	9	6.818
0.19400000	1	0.758
0.20800000	9	6.818
0.22000000	1	0.758
0.23300000	59	44.697
0.25800000	8	6.061
0.27200000	1	0.758
0.28500000	4	3.030
0.30000000	3	2.273
0.31700000	2	1.515
0.46600000	12	9.091
TOTALS	132	100.000

West Union

BG	FREQUENCY	PERCENT
0.0	12	9.091
0.12900000	1	0.758
0.14900000	14	10.606
0.16600000	26	19.697
0.18100000	4	3.030
0.19400000	1	0.758
0.20800000	9	6.818
0.23300000	47	35.606
0.25800000	5	3.788
0.28500000	1	0.758
0.30000000	4	3.030
0.31700000	3	2.273
0.46600000	5	3.788
TOTALS	132	100.000

West Union

CD	FREQUENCY	PERCENT
0.0	11	8.333
0.10500000	1	0.758
0.14900000	16	12.121
0.16600000	26	19.697
0.18100000	14	10.606
0.19400000	2	1.515
0.20800000	9	6.818
0.23300000	42	31.818
0.25800000	3	2.273
0.30000000	1	0.758
0.31700000	2	1.515
0.46600000	5	3.788
TOTALS	132	100.000

West Union

CE	FREQUENCY	PERCENT
0.0	3	2.273
0.14900000	1	0.758
0.16600000	3	2.273
0.18100000	5	3.788
0.19400000	2	1.515
0.20800000	9	6.818
0.23300000	56	42.424
0.25800000	11	8.333
0.27700000	1	0.758
0.28500000	3	2.273
0.30000000	14	10.606
0.31700000	4	3.030
0.33700000	1	0.758
0.36100000	2	1.515
0.46600000	17	12.879
TOTALS	132	100.000

West Union

CF	FREQUENCY	PERCENT
0.0	4	3.030
0.10500000	1	0.758
0.14900000	2	1.515
0.16600000	6	4.545
0.20800000	5	3.788
0.22000000	1	0.758
0.23300000	50	37.879
0.25800000	10	7.576
0.27200000	1	0.758
0.28500000	12	9.091
0.30000000	15	11.364
0.31700000	11	8.333
0.36100000	1	0.758
0.46600000	13	9.848
TOTALS	132	100.000

West Union

CG	FREQUENCY	PERCENT
0.0	11	8.333
0.10500000	1	0.758
0.14900000	5	3.788
0.16600000	17	12.879
0.18100000	5	3.788
0.19400000	1	0.758
0.20800000	16	12.121
0.23300000	65	49.242
0.25800000	1	0.758
0.28500000	1	0.758
0.30000000	4	3.030
0.31700000	1	0.758
0.46600000	4	3.030
TOTALS	132	100.000

West Union

DE	FREQUENCY	PERCENT
0.0	8	6.061
0.10500000	2	1.515
0.14900000	2	1.515
0.16600000	8	6.061
0.18100000	5	3.788
0.20800000	8	6.061
0.23300000	80	60.606
0.25800000	7	5.303
0.28500000	2	1.515
0.30000000	3	2.273
0.31700000	2	1.515
0.46600000	5	3.788
TOTALS	132	100.000

West Union

DF	FREQUENCY	PERCENT
0.0	11	8.333
0.14900000	3	2.273
0.16600000	12	9.091
0.18100000	1	0.758
0.19400000	1	0.758
0.20800000	8	6.061
0.23300000	73	55.303
0.25800000	4	3.030
0.27200000	1	0.758
0.28500000	3	2.273
0.30000000	1	0.758
0.31700000	7	5.303
0.36100000	3	2.273
0.46600000	4	3.030
TOTALS	132	100.000

West Union

DG	FREQUENCY	PERCENT
0.0	2	1.515
0.16600000	3	2.273
0.18100000	4	3.030
0.20800000	1	0.758
0.23300000	40	30.303
0.25800000	15	11.364
0.27200000	3	2.273
0.28500000	13	9.848
0.30000000	26	19.697
0.31700000	9	6.818
0.36100000	2	1.515
0.46600000	14	10.606
TOTALS	132	100.000

West Union

EF	FREQUENCY	PERCENT
0.0	13	9.848
0.14900000	6	4.545
0.16600000	19	14.394
0.18100000	9	6.818
0.19400000	1	0.758
0.20800000	12	9.091
0.22000000	1	0.758
0.23300000	48	36.364
0.25800000	7	5.303
0.27200000	1	0.758
0.28500000	5	3.788
0.30000000	3	2.273
0.31700000	3	2.273
0.46600000	4	3.030
TOTALS	132	100.000

West Union

EG	FREQUENCY	PERCENT
0.0	4	3.030
0.14900000	2	1.515
0.15600000	4	3.030
0.18100000	3	2.273
0.19400000	1	0.758
0.20800000	7	5.303
0.23300000	80	60.606
0.25800000	10	7.576
0.28500000	7	5.303
0.30000000	4	3.030
0.31700000	3	2.273
0.36100000	2	1.515
0.46600000	5	3.788
TOTALS	132	100.000

West Union

FG	FREQUENCY	PERCENT
0.0	3	2.273
0.14900000	5	3.788
0.16600000	8	6.061
0.18100000	2	1.515
0.19400000	1	0.758
0.20800000	7	5.303
0.23300000	63	47.727
0.25800000	11	8.333
0.28500000	4	3.030
0.30000000	6	4.545
0.31700000	5	3.788
0.46600000	17	12.879
TOTALS	132	100.000

APPENDIX 8: THE DATA SET

CODE USED

APPENDIX	MONEY	TOWN	PREFERENCE
A	1	1	1
B	1	1	2
C	1	2	1
D	1	2	2
E	2	1	1
F	2	1	2
G	2	2	1
H	2	2	2
I		1	2
K		2	1
L		2	2

A

RESP	AB	AC	AD	AE	AF	AG	BC	BD	BE	BF
68	60	80	30	50	70	60	60	60	70	70
71	75	50	100	75	50	50	50	75	0	50
73	50	50	50	75	25	25	75	75	25	25
74	0	0	50	100	0	100	100	100	0	100
78	50	30	70	40	40	70	80	40	30	40
79	50	25	75	50	25	50	75	50	25	50
80	50	75	25	25	65	75	50	75	25	75
83	75	50	75	100	50	50	25	75	25	0
84	100	70	50	60	80	50	30	50	60	30
85	60	50	70	40	80	50	40	30	60	70
86	100	50	100	50	60	70	30	50	50	30
90	75	25	100	75	50	50	50	50	50	50
94	50	0	50	50	50	50	50	0	0	50
95	50	0	0	100	0	0	100	0	0	0
99	100	100	0	100	100	0	100	100	0	100
102	60	70	60	70	30	20	70	40	10	60
103	0	0	0	0	0	0	0	0	0	0
104	0	0	100	50	0	0	100	0	0	50
105	70	40	70	70	50	30	35	50	40	30
107	70	50	80	40	30	60	20	50	60	20
109	0	0	0	0	0	0	0	0	0	0
110	60	50	60	50	25	60	50	50	40	40
111	60	40	50	50	0	40	100	0	0	50
115	60	20	100	30	60	50	25	0	60	70
119	25	25	75	50	25	25	75	20	20	80
120	25	50	20	80	10	20	80	60	10	50
122	50	20	75	75	40	30	75	80	25	50
124	70	75	75	50	50	25	25	25	50	25
129	60	50	60	50	50	50	40	50	40	40
131	50	0	0	50	75	50	25	50	50	50
132	0	0	0	0	0	0	0	0	0	0
133	0	0	0	0	0	0	0	0	0	0
134	0	0	0	0	0	0	0	0	0	0
135	0	0	0	0	0	0	0	0	0	0
137	50	50	100	100	0	50	50	100	0	50
139	50	50	50	50	50	50	100	50	0	50
141	10	50	10	80	10	50	100	70	10	80
142	0	0	0	0	0	0	0	0	0	0
147	100	100	0	50	75	100	50	100	50	75
148	0	0	0	0	0	0	0	0	0	0

BG	CD	CE	CF	CG	DE	DF	DG	EF	EG	FG
70	60	50	50	70	50	70	30	70	50	70
25	25	75	100	50	50	75	100	50	75	50
25	25	25	75	50	25	75	75	25	75	50
100	100	0	100	100	100	100	100	100	100	100
30	30	70	70	30	60	60	80	40	60	40
25	50	50	75	50	50	50	75	50	50	50
50	45	75	50	75	50	65	45	50	35	50
50	0	25	50	50	25	75	50	25	50	25
70	50	50	50	50	50	80	40	70	50	70
50	60	50	50	40	50	50	40	60	50	70
30	50	60	80	20	60	50	80	40	50	50
50	50	75	75	50	90	70	100	50	90	50
0	0	100	50	0	50	0	100	0	50	100
0	0	100	100	100	0	100	100	0	100	0
100	0	100	100	100	0	100	0	100	100	100
40	20	60	70	40	10	70	80	60	70	65
0	0	0	0	0	0	0	0	0	0	0
0	0	100	50	0	50	50	100	0	100	0
50	20	50	80	30	50	70	70	50	50	50
40	30	50	80	20	60	80	80	80	60	60
0	0	0	0	0	0	0	0	0	0	0
40	50	50	60	40	50	50	60	50	50	40
0	0	100	100	0	50	50	100	50	50	100
0	50	100	50	0	80	35	75	75	50	100
20	20	80	50	20	50	25	80	20	50	20
50	50	40	50	60	50	50	90	20	50	40
40	30	50	50	60	50	60	60	30	75	40
50	25	75	50	25	75	50	75	75	50	75
50	50	60	60	40	50	50	60	60	50	60
75	50	0	50	50	75	25	50	0	50	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	100	50	100	0	100	0	100	0	50	0
50	50	50	100	50	50	50	100	50	50	100
20	90	40	50	90	40	50	80	20	80	70
0	0	0	0	0	0	0	0	0	0	0
75	50	25	100	75	0	75	25	25	50	75
0	0	0	0	0	0	0	0	0	0	0

A

RESP	AB	AC	AD	AE	AF	AG	BC	BD	BE	BF
150	40	50	50	50	30	50	30	50	70	60
153	20	20	50	80	20	50	50	80	20	20
154	75	50	90	60	20	50	25	60	40	50
159	50	1	99	75	1	20	25	10	10	25
162	60	50	60	50	30	60	70	60	30	30
164	40	30	50	80	50	60	25	60	50	50
166	50	50	75	50	100	0	50	25	50	100
167	30	30	50	40	30	50	60	50	50	70
168	50	0	100	100	0	100	100	100	0	0
169	30	40	30	50	10	60	90	60	20	50
171	50	30	70	50	20	50	70	30	50	70
172	0	0	50	50	0	100	50	100	0	50
174	60	30	100	40	70	40	30	0	20	50
177	40	70	20	50	60	60	60	70	60	70
178	50	30	50	70	20	50	50	70	30	40
179	50	50	50	100	100	0	0	0	0	0
180	50	0	100	100	0	0	100	100	0	0
181	50	50	50	50	75	100	75	50	75	75
185	50	100	50	25	25	50	50	50	25	50
189	50	75	50	75	75	50	25	50	50	75
190	50	50	50	50	25	85	25	40	70	20
191	50	30	80	50	20	50	50	50	20	40
193	70	50	50	50	100	50	50	30	50	70
196	60	20	90	60	20	50	90	70	20	10
197	50	50	70	60	30	50	70	50	30	50
199	0	0	0	0	0	0	0	0	0	0
201	0	0	0	0	0	0	0	0	0	0
202	60	50	70	60	50	30	50	50	30	50

BG	CD	CE	CF	CG	DE	DF	DG	EF	EG	FG
20	50	90	50	50	90	50	90	50	50	50
60	20	50	50	60	50	50	50	20	80	20
40	40	25	50	30	40	50	50	40	50	40
1	10	90	25	10	50	10	99	1	50	1
30	40	40	50	50	50	50	60	50	60	50
60	60	60	60	70	70	50	50	40	60	50
50	50	100	75	50	50	50	50	50	50	100
30	70	60	50	60	50	40	60	50	50	50
0	0	100	100	0	0	0	100	0	100	0
40	40	50	70	70	40	50	60	40	60	20
20	70	60	60	50	70	50	70	50	50	70
0	50	50	100	50	50	50	100	50	100	50
30	40	100	70	40	70	40	80	40	50	35
65	70	50	40	80	50	65	30	65	50	75
50	50	50	60	50	50	50	60	30	60	50
0	0	100	100	0	0	0	100	50	0	100
0	0	100	100	100	50	50	100	50	100	50
50	100	50	50	75	75	50	50	75	50	50
50	50	25	75	50	50	75	50	75	50	75
85	25	25	50	75	25	75	50	50	50	50
40	50	40	20	20	50	50	60	50	25	50
50	50	80	50	40	70	50	90	50	80	50
50	40	80	100	50	50	60	70	100	50	100
0	10	80	90	50	50	60	100	50	90	50
50	40	50	75	60	60	60	80	50	60	60
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
40	40	70	70	40	50	60	70	50	70	70

B

RESP	AB	AC	AD	AE	AF	AG	BC	BD	BE	BF
67	25	50	25	50	75	50	50	75	75	50
69	50	50	50	100	50	50	0	100	50	50
70	60	0	100	80	50	50	50	80	50	20
72	25	30	50	70	20	50	70	50	30	50
75	40	30	70	50	70	50	50	50	50	50
76	50	50	50	50	40	40	50	60	40	40
77	90	25	90	10	75	25	10	10	50	50
81	25	0	50	75	50	75	50	75	25	25
82	90	30	40	100	100	50	0	50	50	40
87	50	40	50	25	20	50	100	50	0	50
88	100	0	100	100	0	25	75	100	0	0
89	75	100	50	50	100	25	50	25	25	0
91	100	50	50	100	0	100	50	100	0	0
92	25	0	50	100	100	0	0	100	0	50
93	40	0	75	50	25	25	75	25	50	75
96	50	75	25	50	25	40	50	25	50	75
97	75	50	75	50	25	50	50	50	25	25
98	100	50	100	50	0	50	0	100	0	0
100	50	80	80	60	0	80	80	80	10	40
101	50	25	50	25	75	50	75	25	50	75
106	50	25	50	0	100	100	0	50	50	50
108	25	50	75	50	50	25	25	50	60	75
112	50	20	70	50	20	50	70	60	20	30
113	0	0	0	0	0	0	0	0	0	0
114	50	50	60	70	40	50	50	60	40	20
116	50	0	100	50	0	0	100	50	0	25
117	60	40	70	75	50	60	40	60	50	50
118	60	50	60	50	25	60	50	40	40	40
121	80	60	80	70	40	30	30	50	40	20
123	50	30	80	40	20	50	90	30	20	30
125	40	70	20	70	50	70	80	70	50	80
126	70	90	50	50	60	50	30	70	75	50
127	75	50	75	75	75	50	25	50	50	25
128	50	40	60	50	50	50	30	60	50	60
130	25	0	100	50	0	75	100	50	50	50
136	75	50	75	50	25	50	75	50	50	50
138	50	50	50	75	50	50	75	75	25	50
140	40	50	50	50	30	50	60	50	40	50
143	50	50	50	75	25	50	75	75	25	25
144	70	30	80	40	30	30	50	40	20	60

BG	CD	CE	CF	CG	DE	DF	DG	EF	EG	FG
75	70	75	50	75	50	75	50	75	50	50
100	50	50	50	100	50	50	100	50	100	50
50	50	60	50	60	50	80	80	20	80	20
30	50	50	70	50	70	50	80	20	50	50
60	50	60	50	50	60	50	50	50	60	50
50	40	50	50	50	40	50	50	40	50	50
25	25	75	75	10	75	50	75	75	50	75
50	25	50	50	50	25	75	50	50	75	25
70	20	50	50	50	40	50	40	40	60	50
0	50	50	100	50	50	20	100	20	50	20
50	0	50	75	75	25	75	75	25	75	50
50	25	50	75	25	25	75	50	25	50	75
0	0	50	50	0	50	50	100	50	100	0
100	0	50	50	50	0	25	25	0	75	50
25	75	75	50	50	100	25	75	50	50	75
25	75	60	50	50	50	50	50	50	25	75
50	25	50	75	50	50	75	75	50	75	50
50	0	50	100	50	50	100	100	50	50	50
50	70	50	60	70	60	80	80	70	60	50
50	75	75	50	50	75	50	75	75	75	75
25	50	50	50	50	75	50	75	75	50	50
50	60	75	50	50	75	50	50	60	75	75
20	20	70	80	50	50	50	80	30	80	50
0	0	0	0	0	0	0	0	0	0	0
20	30	70	80	35	50	50	70	50	80	50
50	25	75	75	50	75	50	75	25	75	50
60	60	70	70	60	60	60	60	50	60	50
25	40	50	60	50	50	50	60	50	60	50
70	20	60	60	50	40	80	40	70	70	80
20	30	50	80	30	90	50	100	50	80	50
50	80	60	80	80	60	80	70	70	70	70
80	50	50	90	50	50	90	20	90	40	80
75	50	50	50	50	50	75	50	50	75	50
40	50	60	40	50	60	50	60	50	60	50
0	50	75	50	50	75	50	50	25	75	25
25	50	50	75	50	50	75	75	50	75	75
50	25	75	50	50	75	50	75	50	75	75
50	60	50	70	50	60	60	70	50	50	50
50	25	50	75	75	50	75	75	50	75	25
60	50	70	70	70	50	30	60	70	40	70

B

RESP	AB	AC	AD	AE	AF	AG	BC	BD	BE	BF	BG
145	100	0	50	50	100	50	50	50	50	100	100
146	75	50	75	25	25	75	75	50	25	50	25
149	25	25	50	75	50	0	50	75	0	75	100
151	50	10	90	60	60	30	50	25	25	80	25
152	60	30	70	75	50	40	70	60	40	40	50
155	50	30	70	60	40	40	50	50	40	50	30
156	100	0	100	0	0	40	50	70	40	0	50
157	80	40	80	50	50	50	20	50	50	50	40
158	75	50	90	80	50	50	20	50	25	10	50
160	70	50	70	25	80	30	30	20	60	50	30
161	10	25	75	50	25	50	75	50	35	50	50
163	50	100	100	100	50	0	50	50	50	50	0
165	50	50	75	75	75	25	50	25	50	75	50
170	90	80	70	70	20	60	60	70	20	30	30
173	0	0	0	0	0	0	0	0	0	0	0
175	50	25	50	50	75	50	50	25	50	75	50
176	0	50	0	25	75	25	100	25	50	100	50
182	50	50	50	0	100	100	100	0	100	100	0
183	60	50	50	70	20	30	70	70	30	50	30
184	0	0	50	50	0	50	100	50	0	50	0
186	0	50	0	50	50	0	100	0	0	100	0
187	60	50	60	70	30	30	50	70	20	30	30
188	80	60	80	20	75	50	60	25	75	60	40
192	60	80	20	30	90	50	40	70	80	80	60
194	75	50	50	25	75	50	75	0	75	100	25
195	75	50	75	50	25	75	50	25	25	50	25
198	60	25	75	50	25	50	60	60	25	40	25
200	100	0	100	100	0	0	0	0	0	0	50
203	60	50	50	40	75	40	50	40	40	50	40

CD	CE	CF	CG	DE	DF	DG	EF	EG	FG
50	100	0	50	100	50	100	50	50	0
50	75	75	50	75	50	60	75	50	50
0	75	50	25	25	25	75	25	50	50
20	90	60	20	75	25	80	30	80	25
30	30	70	40	50	60	70	30	60	30
50	50	60	50	50	50	40	50	50	50
50	50	100	50	100	50	100	50	50	30
25	60	80	50	50	80	80	50	70	50
10	50	50	20	50	50	75	50	50	50
50	75	75	30	80	50	70	75	50	70
50	65	50	50	65	35	75	35	50	35
0	50	50	50	0	100	50	0	50	50
50	75	75	50	50	50	50	50	75	75
20	40	90	50	50	90	70	80	60	80
0	0	0	0	0	0	0	0	0	0
50	75	50	50	75	25	25	50	50	25
100	75	25	75	75	25	50	75	50	75
100	100	100	50	50	0	100	100	50	50
30	50	70	30	50	50	70	50	50	50
50	50	100	50	50	25	100	50	50	25
100	50	50	100	50	50	75	50	50	100
20	50	70	30	20	40	70	20	50	70
75	75	80	25	80	50	75	80	50	80
90	50	40	50	50	40	10	60	40	50
75	100	75	50	75	50	75	75	50	75
50	50	75	50	50	50	75	75	50	50
25	50	50	50	60	50	60	50	50	50
0	50	50	0	50	50	100	0	50	50
50	75	60	50	60	60	75	50	50	60

C

RESP	AB	AC	AD	AE	AF	AG	BC	BD	BE	BF	BG
2	0	25	50	100	0	0	0	0	0	0	0
3	50	50	20	90	20	20	80	70	10	30	20
4	50	60	40	70	50	50	40	40	40	30	50
8	70	50	70	80	50	30	50	50	50	40	60
9	85	70	85	70	100	0	25	0	50	100	40
11	50	75	25	50	25	50	50	40	50	50	25
14	75	50	75	50	25	50	50	40	25	25	25
17	50	50	50	50	40	50	50	50	50	50	50
18	0	50	0	30	100	50	50	0	100	100	75
20	50	50	100	50	100	0	50	0	0	50	0
22	0	50	50	100	0	100	50	100	0	0	50
23	30	50	40	50	0	50	70	40	20	40	30
26	50	25	50	100	50	25	50	50	0	50	50
28	75	50	50	50	50	50	25	50	25	25	25
30	40	40	60	60	40	40	60	40	25	50	25
33	100	40	40	50	60	20	20	40	40	60	60
34	50	50	50	40	30	50	80	40	25	35	25
35	50	50	75	100	100	0	0	0	50	100	50
36	50	50	50	50	80	25	25	25	50	80	50
37	75	50	75	50	75	50	25	50	25	25	25
40	50	25	75	50	25	0	75	50	25	50	25
43	75	50	50	75	50	10	10	50	50	50	75
45	50	25	50	50	25	50	75	25	25	50	25
46	25	25	50	50	25	50	85	50	25	50	50
48	0	0	100	50	0	0	100	0	0	50	0
50	50	25	50	50	25	25	50	50	25	25	25
52	100	0	50	100	0	50	50	50	50	50	50
53	50	50	50	50	25	25	75	25	25	25	75
58	25	50	25	75	75	50	25	50	50	50	50
59	50	50	50	75	25	25	50	25	25	50	25
61	60	100	50	75	100	0	50	50	50	100	100
63	50	0	60	50	40	40	50	40	0	50	40
64	50	0	0	0	0	0	100	0	0	100	0

CD	CE	CF	CG	DE	DF	DG	EF	EG	FG
50	50	50	50	50	0	50	50	50	50
30	40	20	20	10	20	30	20	20	20
30	50	70	50	60	50	80	50	60	50
20	90	70	50	40	60	70	50	70	70
35	100	80	35	50	65	65	65	50	100
50	40	50	25	25	50	70	50	50	60
25	50	75	25	50	50	75	60	50	50
50	50	50	50	50	50	50	50	50	50
100	100	0	75	50	0	0	30	50	100
50	100	100	50	50	50	100	0	50	50
50	0	50	50	50	50	50	0	50	0
40	40	70	40	50	50	70	50	40	30
0	50	50	50	0	50	50	0	50	50
25	50	25	25	50	25	75	50	50	50
25	75	75	25	50	50	75	40	60	40
30	80	75	40	70	40	70	80	30	50
50	40	45	50	40	60	70	45	50	50
50	100	100	50	100	100	50	50	100	100
50	50	50	50	50	80	50	80	50	50
25	75	100	25	50	50	75	75	50	75
25	50	50	25	50	25	75	25	50	50
25	50	75	25	50	50	75	50	75	75
50	75	75	25	75	25	75	25	25	50
25	25	50	50	25	50	75	25	50	25
0	0	100	0	0	0	100	0	0	0
50	50	75	50	50	50	75	50	50	50
50	50	50	50	50	50	50	50	50	50
25	25	75	75	25	25	75	25	75	25
25	75	50	50	50	50	50	25	50	50
50	50	50	50	25	50	50	25	25	50
25	100	50	75	50	75	50	50	60	100
0	100	0	0	50	0	100	0	50	50
0	50	50	0	0	0	50	0	0	100

D

RESP	AB	AC	AD	AE	AF	AG	BC	BD	BE	BF	BG
1	0	0	0	0	0	0	0	0	0	0	0
5	75	0	100	0	25	100	50	0	100	50	0
6	50	50	70	50	30	50	50	20	30	30	50
7	50	50	25	60	90	25	50	40	50	70	50
10	0	50	0	0	50	50	50	0	50	100	0
12	50	30	50	70	10	50	75	50	50	40	40
13	25	30	50	70	25	50	50	30	30	50	50
15	50	50	60	40	20	25	40	40	20	50	20
16	50	50	40	60	40	50	65	40	35	50	40
19	25	50	25	65	50	25	65	25	25	65	25
21	50	50	100	50	0	50	100	0	50	50	0
24	100	100	100	80	50	70	0	100	20	0	50
25	80	50	25	50	25	35	50	0	0	25	25
27	50	50	50	75	25	50	50	50	25	50	50
29	30	30	70	40	60	50	70	40	50	60	50
31	75	50	50	75	0	25	50	50	25	75	50
32	70	100	30	50	30	30	30	30	30	20	50
38	40	50	50	25	50	50	50	25	0	50	25
39	50	0	75	50	75	50	50	50	50	50	50
41	50	0	100	50	100	50	50	50	50	50	50
42	0	100	50	100	100	0	100	0	0	100	50
44	50	25	75	50	25	50	75	35	0	15	15
47	50	0	60	50	25	40	50	40	30	50	50
49	75	50	75	50	50	50	50	25	50	50	25
51	50	50	50	50	25	90	50	75	50	25	50
54	75	50	50	50	50	50	75	50	25	50	25
55	25	50	75	50	30	50	50	40	40	25	30
56	50	25	50	50	40	40	60	40	25	40	0
57	50	50	40	70	50	50	50	50	40	50	50
60	75	25	50	50	75	25	50	25	50	50	50
62	50	50	75	50	0	50	50	40	0	50	25
65	50	50	50	50	20	50	50	50	20	20	20
66	25	50	50	50	25	25	75	50	25	50	25

CD	CE	CF	CG	DE	DF	DG	EF	EG	FG
0	0	0	0	0	0	0	0	0	0
75	100	100	0	100	25	100	100	50	100
50	30	50	50	40	50	50	50	50	20
60	90	20	50	80	50	40	50	60	75
100	50	50	50	50	50	50	100	0	100
25	40	50	40	40	40	50	25	50	50
25	25	50	50	50	50	50	50	50	50
20	60	80	20	50	50	80	40	50	60
40	60	60	50	50	50	60	50	40	60
50	50	65	50	25	25	50	25	35	50
50	100	100	50	50	50	100	50	50	50
0	50	80	0	50	80	80	50	70	50
50	35	50	50	50	50	65	50	50	25
25	50	50	50	25	50	75	25	50	50
40	60	50	40	50	40	60	40	50	50
25	85	100	50	50	100	100	50	90	50
20	50	80	30	0	70	30	30	30	70
0	75	75	25	0	50	75	25	50	50
25	50	50	50	50	50	50	0	50	50
50	100	50	50	50	0	100	50	100	50
50	100	100	100	50	100	100	0	100	100
0	75	75	25	50	35	75	35	50	35
50	60	50	50	50	50	60	50	50	60
25	75	75	25	75	50	75	75	50	75
25	50	25	25	60	50	60	60	50	50
50	50	75	25	50	50	75	50	50	50
30	50	70	25	50	50	70	50	50	50
25	60	50	0	50	0	25	25	40	50
50	60	50	50	50	50	60	50	50	50
50	75	25	25	50	50	50	25	50	75
40	50	60	40	60	50	60	50	60	50
20	20	80	20	20	50	50	20	20	20
50	75	50	50	50	25	75	50	50	25

E

RESP	AB	AC	AD	AE	AF	AG	BC	BD	BE	BF	BG
68	0	0	0	0	0	0	0	0	0	0	0
71	100	50	100	100	50	50	50	50	0	50	50
73	75	75	75	75	25	25	75	75	25	50	25
74	0	0	100	100	0	0	100	100	0	100	100
78	0	0	0	0	0	0	0	0	0	0	0
79	50	25	35	50	35	50	65	65	35	50	50
80	50	60	30	50	70	50	50	35	50	65	50
83	50	75	50	100	25	50	25	100	25	0	75
84	100	100	100	0	100	50	0	70	100	50	100
85	60	70	60	40	60	70	50	40	70	60	40
86	80	50	80	30	30	70	50	50	30	40	20
90	75	25	100	75	50	50	50	50	50	50	50
94	50	0	50	50	50	0	100	0	0	50	50
95	100	0	50	100	0	50	100	100	0	0	50
99	0	0	0	0	0	0	0	0	0	0	0
102	60	30	50	60	40	20	50	40	20	50	50
103	0	0	0	0	0	0	0	0	0	0	0
104	0	0	100	100	0	0	100	0	0	0	0
105	80	70	70	70	40	30	50	80	30	30	50
107	80	50	70	30	20	70	40	50	60	20	30
109	0	0	0	0	0	0	0	0	0	0	0
110	50	40	60	60	40	60	50	60	25	25	40
111	60	40	50	50	0	40	100	0	0	50	0
115	75	50	75	20	70	50	40	0	80	60	30
119	30	30	60	50	50	40	80	10	20	50	10
120	20	50	40	80	20	50	80	80	20	50	50
122	40	40	60	70	20	40	60	60	30	40	50
124	75	75	75	50	75	50	25	25	50	50	50
129	60	50	60	50	50	40	50	40	50	40	40
131	0	25	50	75	25	50	25	75	50	25	50
132	0	0	0	0	0	0	0	0	0	0	0
133	0	0	0	0	0	0	0	0	0	0	0
134	0	0	0	0	0	0	0	0	0	0	0
135	0	0	0	0	0	0	0	0	0	0	0
137	0	0	0	100	0	100	100	0	0	100	0
139	50	50	50	50	50	50	100	50	0	50	50
141	10	30	20	30	10	50	90	80	20	80	20
142	0	0	0	0	0	0	0	0	0	0	0
147	50	100	0	50	75	25	50	75	50	75	75
148	0	0	0	0	0	0	0	0	0	0	0

CD	CE	CF	CG	DE	DF	DG	EF	EG	FG
0	0	0	0	0	0	0	0	0	0
0	100	50	50	50	70	100	50	100	50
25	50	75	50	25	75	75	50	75	50
100	100	0	100	100	100	100	100	100	100
0	0	0	0	0	0	0	0	0	0
50	50	65	50	50	50	65	50	65	35
50	60	50	50	50	60	30	60	40	70
0	0	25	50	25	75	25	25	50	25
50	100	50	50	50	100	0	100	100	100
80	50	70	50	70	60	70	80	60	80
30	50	80	30	60	50	80	50	50	50
50	75	75	50	90	70	100	50	90	50
0	100	0	0	100	0	100	0	100	100
0	100	100	100	0	100	100	0	100	0
0	0	0	0	0	0	0	0	0	0
40	50	40	50	40	50	60	50	60	60
0	0	0	0	0	0	0	0	0	0
0	100	100	0	50	0	100	0	50	0
20	50	80	50	30	70	80	50	60	50
40	50	80	20	70	70	80	80	60	50
0	0	0	0	0	0	0	0	0	0
25	50	50	40	60	50	60	50	60	50
0	100	100	0	50	50	100	50	50	100
50	100	65	0	100	40	65	90	50	100
20	80	20	50	50	20	80	10	50	20
40	40	80	50	40	50	60	40	50	50
40	50	60	80	50	60	50	40	80	50
25	75	50	25	75	50	75	50	75	75
50	60	60	40	60	50	60	60	50	60
25	50	75	50	25	25	50	25	75	25
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	100	100	100	100	0	100	0	50	0
50	50	100	50	50	50	100	50	50	100
90	50	90	90	50	50	80	40	30	40
0	0	0	0	0	0	0	0	0	0
75	25	75	75	25	75	25	75	50	75
0	0	0	0	0	0	0	0	0	0

E

RESP	AB	AC	AD	AE	AF	AG	BC	BD	BE	BF	BG
150	40	20	80	50	50	50	70	50	50	50	50
153	20	20	50	100	50	50	50	80	20	20	80
154	70	60	70	60	30	30	30	60	40	50	50
159	50	0	80	50	0	80	90	20	20	20	20
162	60	40	60	80	40	50	80	70	30	40	60
164	60	50	40	60	40	50	70	60	50	60	50
166	50	50	50	50	75	0	50	0	50	75	50
167	0	0	25	25	50	50	100	25	50	100	50
168	0	0	0	0	0	0	0	0	0	0	0
169	20	40	30	70	20	70	80	40	20	50	20
171	50	50	70	40	50	50	80	30	50	70	20
172	0	0	50	50	0	100	50	100	0	50	0
174	60	30	80	40	50	30	50	30	40	50	40
177	30	60	25	50	65	50	60	50	60	70	75
178	60	50	70	80	20	50	50	70	20	30	70
179	50	50	50	100	100	0	0	0	0	0	0
180	50	25	75	80	0	50	50	75	25	50	50
181	0	100	0	0	50	100	100	20	100	80	50
185	90	90	50	50	30	80	50	50	30	30	30
189	75	50	50	85	75	25	50	50	25	50	75
190	50	40	70	30	40	80	30	50	80	20	40
191	50	20	90	50	0	50	80	50	20	40	30
193	70	50	70	20	100	50	50	0	80	70	20
196	70	20	100	50	0	50	100	80	20	10	0
197	60	50	70	60	30	50	70	50	30	50	30
199	0	0	0	0	0	0	0	0	0	0	0
201	0	0	0	0	0	0	0	0	0	0	0
202	80	50	80	70	50	40	50	40	30	50	50

CD	CE	CF	CG	DE	DF	DG	EF	EG	FG
50	80	50	60	70	50	70	50	60	50
20	50	50	80	50	50	50	20	80	20
50	40	60	50	40	60	60	50	40	60
50	80	50	50	90	10	90	20	50	20
50	60	60	70	50	60	70	60	60	50
60	50	60	50	60	60	70	50	60	50
50	100	50	50	50	50	50	50	50	100
100	75	50	75	50	25	75	50	50	50
0	0	0	0	0	0	0	0	0	0
70	40	70	50	40	30	80	70	20	20
70	60	70	50	60	50	80	70	50	60
50	50	100	50	50	50	100	50	100	50
40	70	70	40	50	40	70	40	50	40
70	50	40	80	50	70	25	60	50	65
20	50	70	60	50	50	80	50	80	50
0	100	100	0	0	0	100	50	0	100
20	75	75	50	50	75	75	25	75	50
100	50	100	100	80	50	50	100	50	80
30	50	70	50	50	70	50	70	50	70
15	50	50	75	25	75	50	25	50	50
50	40	20	20	80	30	50	50	50	50
40	90	60	50	100	50	100	50	80	50
100	100	100	30	100	70	100	100	50	100
10	50	100	50	70	60	100	50	100	50
50	60	80	50	60	60	80	60	60	60
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
30	70	70	50	60	70	70	50	70	70

F

RESP	AB	AC	AD	AE	AF	AG	BC	BD	BE	BF
67	25	75	50	30	75	50	25	50	75	50
69	50	0	50	100	0	50	50	100	50	0
70	80	20	80	60	20	50	50	50	40	50
72	50	30	50	50	0	50	80	50	20	20
75	40	30	70	50	70	50	50	50	50	50
76	60	50	60	60	35	50	50	50	40	35
77	90	50	90	10	50	25	25	25	25	25
81	75	50	75	75	25	75	25	75	50	25
82	50	50	60	90	100	50	30	70	50	20
87	50	20	80	80	0	50	100	50	0	50
88	50	50	75	75	25	50	75	75	0	25
89	100	75	50	75	25	50	50	75	25	25
91	100	50	100	50	0	50	50	50	0	0
92	25	50	50	75	75	25	25	50	25	75
93	25	25	50	25	50	75	75	25	50	25
96	50	50	30	50	40	50	50	30	30	50
97	70	60	70	80	30	60	50	70	30	40
98	100	50	100	100	0	50	0	50	50	0
100	50	30	40	70	30	80	80	70	40	40
101	50	25	50	25	75	50	75	25	50	75
106	100	50	100	0	75	50	25	0	50	75
108	60	50	60	25	60	50	40	40	75	60
112	50	30	80	50	30	50	90	0	30	50
113	0	0	0	0	0	0	0	0	0	0
114	60	50	80	60	50	50	30	60	20	10
116	80	20	80	50	20	30	60	50	20	40
117	60	40	50	70	50	50	60	60	50	50
118	60	40	75	50	40	50	50	60	40	40
121	80	70	70	70	60	40	20	60	50	30
123	50	30	80	80	10	50	90	70	20	30
125	30	70	20	50	40	60	80	70	50	80
126	80	70	50	50	70	50	40	50	60	60
127	70	50	70	80	50	25	30	70	50	30
128	50	40	60	50	60	50	40	50	60	50
130	50	25	75	50	25	50	75	50	50	75
136	75	50	75	50	50	50	75	50	25	25
138	50	50	50	75	50	50	75	75	25	50
140	50	40	70	50	40	50	60	50	20	50
143	75	50	75	75	25	50	75	75	25	25
144	70	30	80	40	30	30	50	40	20	50

BG	CD	CE	CF	CG	DE	DF	DG	EF	EG	FG
50	75	50	50	75	75	75	50	75	75	50
50	0	50	50	100	50	50	100	50	50	50
40	40	60	80	50	60	50	80	50	60	50
20	20	50	80	50	20	50	80	30	80	50
60	50	60	50	50	60	50	50	50	60	50
50	40	50	60	40	40	50	55	40	50	40
25	25	75	85	25	75	75	85	75	75	85
75	25	50	75	50	50	75	75	50	75	50
60	20	50	40	50	30	70	40	50	70	50
0	50	50	100	50	40	50	100	30	50	50
50	10	25	75	50	25	75	75	25	75	50
50	25	25	75	50	25	75	50	50	50	75
0	50	50	100	50	50	50	100	50	50	50
75	25	50	50	25	25	50	50	25	75	25
25	75	75	75	50	75	25	75	50	50	50
30	50	30	60	50	30	50	50	40	30	50
30	20	50	80	60	50	70	70	80	60	70
50	50	100	100	0	50	100	100	50	100	100
40	40	50	70	70	90	70	70	80	60	40
50	75	75	50	50	75	50	75	75	75	75
50	75	50	50	50	50	50	50	75	50	75
60	60	75	50	50	60	50	50	60	60	60
20	20	70	90	40	50	50	90	20	90	50
0	0	0	0	0	0	0	0	0	0	0
30	30	60	70	30	50	50	60	50	70	50
30	30	60	70	30	50	70	80	30	80	50
70	50	60	60	70	70	60	50	70	70	50
50	40	50	60	40	50	60	60	50	50	40
70	30	50	70	50	30	80	60	80	80	80
20	40	60	90	50	80	50	90	50	80	50
70	80	40	70	80	60	80	60	80	70	70
70	50	50	90	50	60	90	30	90	50	90
70	30	50	50	60	70	80	50	50	70	50
50	50	60	40	50	60	50	60	50	60	50
25	50	75	50	75	75	50	75	50	75	50
25	25	50	75	50	50	75	75	50	75	50
50	25	75	50	50	75	50	75	50	75	75
40	40	60	70	50	60	50	70	50	50	50
50	25	50	75	50	50	75	75	25	75	25
60	50	70	70	50	50	30	60	70	50	70

F

RESP	AB	AC	AD	AE	AF	AG	BC	BD	BE	BF
145	40	50	50	75	50	25	50	50	50	50
146	75	50	75	50	25	75	75	50	50	25
149	50	25	75	75	50	25	50	50	25	50
151	50	20	80	75	40	40	25	25	25	20
152	70	40	70	80	30	40	70	80	30	50
155	80	50	80	50	40	40	80	50	20	40
156	70	30	80	50	30	50	50	60	50	40
157	80	50	80	50	20	50	40	50	50	30
158	90	50	90	80	50	50	10	50	30	10
160	75	50	70	25	70	35	30	25	70	50
161	20	25	50	50	25	50	75	50	35	65
163	50	50	50	50	50	0	60	60	0	70
165	80	70	70	30	70	30	60	30	50	70
170	100	80	70	70	20	60	60	70	20	30
173	0	0	0	0	0	0	0	0	0	0
175	25	50	75	25	75	50	50	25	50	50
176	0	50	0	25	75	25	100	25	75	100
182	0	0	50	25	0	50	100	25	50	50
183	70	50	70	50	30	50	70	50	20	30
184	0	0	100	50	0	50	100	50	0	50
186	0	50	0	25	50	50	100	25	50	100
187	70	70	50	70	50	20	50	60	10	40
188	80	50	80	20	70	50	30	30	70	60
192	70	80	20	40	90	50	40	70	80	80
194	75	50	50	25	75	50	75	0	75	100
195	75	50	75	50	25	75	50	25	25	50
198	25	50	60	50	40	50	40	50	40	25
200	100	0	100	100	0	0	C	100	0	0
203	60	50	50	40	60	40	50	25	40	60

BG	CD	CE	CF	CG	DE	DF	DG	EF	EG	FG
75	50	75	50	50	50	25	75	50	75	25
25	50	75	75	25	75	60	75	50	50	50
50	0	75	50	50	50	75	75	25	75	50
40	20	90	60	30	90	20	75	20	70	25
40	30	50	80	20	40	70	70	50	40	60
30	20	60	60	40	50	50	60	50	60	60
50	50	50	50	40	80	50	60	50	60	50
50	30	50	70	50	50	25	80	50	50	40
50	10	70	60	10	50	50	60	50	80	60
25	50	75	80	25	80	50	75	80	50	75
25	65	65	65	50	65	35	75	35	50	35
50	0	50	50	50	0	60	50	0	50	60
30	30	70	70	30	70	70	70	80	30	70
20	20	40	100	50	50	100	70	80	60	80
0	0	0	0	0	0	0	0	0	0	0
25	50	75	50	50	75	25	75	50	50	75
50	100	75	50	75	75	50	25	75	25	75
0	75	50	100	50	75	75	100	100	50	100
20	30	50	80	30	50	50	70	50	50	50
0	50	50	75	50	50	0	100	50	50	25
25	100	75	50	100	50	25	75	50	25	75
40	10	50	70	50	10	50	70	30	40	50
40	70	80	60	30	80	60	70	80	60	70
70	90	50	40	50	50	60	10	60	30	50
25	75	100	75	50	75	50	75	75	50	75
25	50	50	75	50	50	50	75	75	50	50
50	40	50	60	50	60	50	60	50	50	40
100	0	100	0	0	50	0	100	0	50	0
50	50	75	60	50	50	50	60	50	50	60

G

RESP	AB	AC	AD	AE	AF	AG	BC	BD	BE	BF
2	50	50	75	50	25	50	50	25	50	50
3	20	50	40	80	50	50	40	40	50	50
4	30	50	40	50	40	60	80	70	60	70
8	90	50	90	90	60	0	30	50	40	60
9	40	40	50	50	100	0	60	0	50	100
11	50	50	50	25	25	50	75	50	50	50
14	80	50	70	40	40	50	50	40	40	50
17	50	50	50	50	50	50	50	50	50	50
18	0	50	0	50	100	0	50	0	100	100
20	50	0	100	50	50	0	50	0	0	50
22	20	50	50	70	20	80	50	70	50	20
23	50	60	60	50	30	40	60	60	30	30
26	50	40	50	100	50	30	50	50	0	50
28	50	50	75	50	25	50	50	50	25	50
30	40	40	75	60	25	40	60	60	25	25
33	50	40	30	40	40	30	20	40	70	60
34	30	40	40	60	30	40	50	70	20	45
35	50	50	80	50	100	0	10	0	50	100
36	60	50	50	75	80	25	25	25	75	75
37	90	50	90	50	30	50	30	50	20	30
40	50	25	50	50	25	25	75	25	25	50
43	80	50	50	75	50	50	20	70	50	50
45	50	40	60	50	20	40	60	20	50	40
46	25	15	50	75	25	50	85	50	25	25
48	50	0	0	100	0	100	100	100	0	0
50	20	50	40	60	20	40	60	50	20	30
52	50	50	50	50	50	50	50	50	50	50
53	10	10	30	90	10	90	80	80	10	50
58	25	50	50	50	50	0	50	100	50	50
59	50	50	75	75	50	25	50	25	0	25
61	60	60	50	80	100	0	50	50	50	80
63	40	40	100	40	50	40	50	0	40	50
64	25	25	50	50	25	25	75	25	25	75

BG	CD	CE	CF	CG	DE	DF	DG	EF	EG	FG
50	25	75	50	50	50	50	75	25	75	50
20	30	50	50	40	40	50	50	40	50	50
40	80	70	70	60	50	60	60	70	60	50
60	20	80	90	50	50	90	60	60	90	100
50	60	100	40	50	60	40	50	60	50	100
25	40	50	75	50	50	50	75	50	50	60
20	40	60	80	20	60	50	80	70	50	60
50	50	50	50	50	50	50	50	50	50	50
100	100	100	0	100	50	30	0	50	40	100
0	0	50	100	0	50	0	100	50	50	50
50	20	30	50	50	50	50	50	30	50	20
40	50	40	60	50	40	50	60	40	40	50
50	0	50	50	50	0	50	50	0	50	50
25	25	50	75	25	50	50	75	50	50	50
25	25	60	75	40	50	40	75	40	60	25
70	40	30	40	40	70	50	30	70	70	40
60	30	50	60	70	50	60	70	50	60	60
80	30	100	70	10	80	80	50	80	80	100
50	50	50	50	50	50	80	50	50	80	80
50	20	70	80	50	50	70	70	60	50	80
25	50	75	50	50	50	25	75	25	50	50
80	40	80	50	50	60	80	50	50	75	80
50	50	40	60	50	50	40	60	40	50	40
50	50	75	50	50	50	25	75	25	50	25
0	100	0	100	0	100	0	100	0	50	0
30	20	50	70	40	30	50	70	20	40	50
50	50	50	50	50	50	50	50	50	50	50
20	80	30	10	30	10	90	90	20	40	40
100	50	50	0	50	50	50	50	0	50	50
25	25	50	50	25	50	50	50	25	50	50
100	20	100	50	80	50	80	50	50	80	100
40	20	50	50	40	50	0	100	0	50	50
25	25	50	25	75	25	50	25	25	25	50

H

RESP	AB	AC	AD	AE	AF	AG	BC	BD	BE	BF	BG
1	0	0	0	0	0	0	0	0	0	0	0
5	70	0	100	0	70	70	50	0	100	70	0
6	50	50	80	50	40	50	20	60	40	40	20
7	50	40	50	30	80	40	50	40	60	60	60
10	50	100	0	0	100	50	50	0	50	100	50
12	50	25	50	75	25	25	50	50	20	50	25
13	30	50	50	70	30	50	50	70	30	50	50
15	40	50	60	50	20	50	60	40	20	50	20
16	50	50	40	40	25	25	70	40	40	60	35
19	40	50	30	50	40	30	60	30	20	70	40
21	50	50	75	50	50	0	50	0	50	50	50
24	90	80	90	80	20	80	20	70	30	20	80
25	0	0	50	100	100	100	75	0	0	25	0
27	50	50	50	70	40	30	60	60	30	40	50
29	40	50	60	50	40	50	70	50	40	50	50
31	90	50	80	100	10	50	80	60	10	10	20
32	70	80	50	70	50	20	20	30	30	50	50
38	40	50	80	50	20	50	80	50	20	30	20
39	50	50	50	50	75	50	25	50	25	50	75
41	0	0	100	100	0	50	50	50	0	50	50
42	100	100	50	100	100	0	100	50	0	100	100
44	30	20	70	50	30	10	50	40	20	60	30
47	50	40	60	50	40	40	50	40	40	50	40
49	100	50	100	25	50	50	25	25	50	50	25
51	60	40	60	50	40	40	50	60	60	40	50
54	30	50	30	50	30	50	70	30	30	30	20
55	80	50	80	50	30	50	50	50	40	20	20
56	50	25	75	50	40	50	50	20	40	40	20
57	50	50	50	67	50	50	50	67	50	50	50
60	80	50	80	50	80	20	30	10	50	60	50
62	50	50	80	50	0	50	50	40	0	50	20
65	50	50	50	50	20	50	50	70	20	30	50
66	30	25	50	50	25	75	50	50	25	50	25

CD	CE	CF	CG	DE	DF	DG	EF	EG	FG
0	0	0	0	0	0	0	0	0	0
100	100	70	0	100	0	100	100	70	100
20	50	80	50	50	50	80	60	60	20
50	60	40	50	50	40	50	60	50	60
50	50	50	50	50	50	50	100	0	100
50	50	25	50	50	25	75	20	50	25
30	30	50	50	30	50	50	30	50	50
50	60	80	40	50	50	80	40	50	60
35	50	60	40	50	50	65	40	50	50
20	50	70	50	30	50	80	70	50	60
50	75	100	50	50	50	75	50	50	50
30	50	80	50	30	80	70	70	70	70
25	35	50	0	100	25	75	50	25	25
30	40	60	50	30	50	70	30	50	30
40	50	40	40	50	40	60	40	50	40
10	50	100	40	40	90	90	40	70	80
20	50	70	30	0	70	30	30	50	70
60	50	60	50	50	50	60	50	50	60
25	50	50	50	25	50	25	25	50	50
0	100	50	100	50	50	100	50	100	100
0	100	100	100	0	100	100	0	100	100
20	70	50	30	50	20	70	20	50	40
30	60	50	40	50	50	60	30	50	50
25	75	75	0	75	50	75	75	50	75
50	50	40	50	50	50	60	50	50	40
50	50	80	50	50	50	70	50	50	50
20	50	70	20	50	50	80	50	50	50
20	50	60	40	40	20	80	30	30	50
50	67	50	50	50	50	50	50	50	50
30	80	50	50	50	50	50	40	70	80
30	50	70	30	60	50	60	50	60	50
30	40	60	50	20	50	50	30	50	50
50	50	25	50	50	25	50	25	50	50

I

RESP	SEX	MARITAL	HEAD	HHSIZE	RESPAGE	SPOUSAGE	RESPED	SPOUSED
68	1	2	1	4	35	35	20	17
71	2	2	2	2	69	68	15	8
73	1	2	1	5	53	50	18	14
74	1	2	1	5	56	55	12	16
78	2	2	2	2	52	56	13	12
79	2	2	2	2	69	71	8	8
80	2	2	2	4	32	38	15	12
102	1	2	1	5	48	51	9	8
103	2	1	1	1	61	88	8	88
104	2	1	1	1	77	88	8	88
105	2	2	2	3	39	45	12	8
107	2	2	2	5	27	29	12	12
109	1	2	1	2	84	65	8	8
110	1	2	1	3	57	56	8	8
115	2	2	2	4	20	26	12	12
119	1	2	1	3	70	68	6	8
120	2	2	2	4	31	34	12	8
83	1	1	1	1	23	88	16	88
84	1	1	1	1	23	88	16	88
85	1	2	1	2	22	22	16	16
86	1	1	1	2	22	88	14	88
90	2	2	2	2	57	59	18	13
94	1	2	1	2	57	56	8	8
95	1	2	1	2	57	55	12	13
99	1	2	1	2	62	61	16	12
122	1	2	1	2	84	84	8	8
124	1	1	1	1	22	88	14	88
129	2	2	2	3	31	32	12	12
131	2	1	1	2	53	88	8	88
132	2	1	1	2	85	88	8	88
133	1	2	1	2	81	81	8	9
134	2	1	1	1	61	88	8	99
135	2	2	2	2	72	75	8	8
136	2	2	2	4	45	55	12	8
137	2	2	2	2	79	76	5	8
139	2	2	2	2	74	75	5	8
141	2	1	1	2	23	88	16	88
142	2	1	1	1	84	88	5	88
147	1	2	1	2	20	19	14	13
148	1	2	1	2	75	75	12	8

ROCCUP	RWORK	SPOCCUP	SPWORK	YRSCOMM	PRERES	WHYMOVE	INCOME
0	0	9	0	6	4	2	4
9	0	2	0	69	8	8	6
0	0	9	0	26	4	5	9
5	0	9	0	49	2	3	4
2	0	2	0	52	8	8	5
3	0	1	1	33	1	1	2
9	0	2	0	10	1	4	4
2	0	9	0	48	8	8	5
9	1	8	8	56	1	3	1
7	1	8	8	25	1	2	1
6	0	5	0	39	8	8	3
9	0	6	0	25	4	6	3
1	1	3	1	30	1	6	3
5	0	9	0	57	8	8	3
9	0	4	0	20	8	8	3
5	0	9	0	60	1	6	2
3	0	6	0	31	8	8	4
0	0	8	8	23	8	8	3
0	0	8	8	1	4	2	3
0	0	9	0	1	2	2	1
8	0	8	8	22	8	8	3
0	0	5	0	19	1	2	5
6	0	9	0	2	1	2	3
0	0	7	0	57	8	8	4
2	0	9	1	41	1	2	6
1	1	9	1	71	4	3	3
4	0	8	8	5	4	3	2
9	0	1	0	31	8	8	4
6	0	8	8	27	1	2	3
8	1	8	8	31	1	6	1
1	1	9	1	81	8	8	2
9	1	8	8	40	1	6	1
9	1	1	1	72	8	8	9
9	0	6	0	45	8	8	3
7	1	2	1	50	4	6	2
7	0	7	0	17	1	2	1
0	0	8	8	5	2	2	2
9	1	8	8	84	8	8	1
0	0	4	0	1	3	4	1
1	1	9	0	75	8	8	3

I

RESP	SEX	MARITAL	HEAD	HHSIZE	RESPAGE	SPOUSAGE	RESPED	SPOUSED
150	2	2	2	2	66	68	8	8
153	1	2	1	4	45	43	8	13
154	2	2	2	4	25	27	12	12
159	1	2	1	3	79	70	4	6
162	2	2	2	4	29	32	10	12
164	1	2	1	2	60	61	8	8
166	1	2	1	4	23	26	10	12
167	1	2	1	2	60	56	8	12
168	1	2	1	2	54	53	12	16
169	2	1	1	1	22	88	16	88
171	2	1	1	2	20	88	15	88
172	2	2	2	3	58	62	14	12
174	1	2	1	3	54	48	12	14
177	2	1	1	2	38	88	19	88
178	2	2	2	6	37	44	12	7
179	1	2	1	2	50	49	8	16
180	1	2	1	5	36	38	9	8
181	1	2	1	6	41	39	20	15
185	1	2	1	6	41	33	18	16
189	2	2	2	4	28	27	12	14
190	2	2	2	4	39	40	13	18
191	1	2	1	2	70	70	19	12
193	1	2	1	5	30	29	12	12
196	2	2	2	2	59	65	12	12
197	2	2	2	2	74	78	16	18
199	1	2	1	2	21	21	12	12
201	2	2	2	2	23	25	13	16
202	2	1	1	3	25	88	12	88

ROCCUP	RWORK	SPOCCUP	SPWORK	YRSCOMM	PRERES	WHYMOVE	INCOME
9	0	4	1	66	8	8	2
5	0	3	0	45	8	8	4
9	0	2	0	25	8	8	4
7	0	7	0	79	8	8	2
9	0	5	0	4	4	2	3
5	0	7	0	31	1	2	3
5	0	9	0	23	8	8	4
5	0	9	0	39	1	2	4
2	0	0	0	15	2	1	5
3	0	8	8	4	3	2	1
7	0	8	8	3	4	2	1
9	0	2	0	58	8	8	5
6	0	9	0	3	2	6	3
0	0	8	8	3	4	2	3
9	0	5	0	2	1	2	2
2	0	0	0	45	1	3	5
4	0	9	0	15	1	2	5
0	0	3	0	6	1	2	4
0	0	0	0	8	4	2	4
9	0	5	0	1	4	2	5
3	0	0	0	14	3	2	5
0	1	9	1	5	4	5	2
6	0	9	0	8	4	5	3
3	0	1	1	46	1	3	3
0	1	0	1	12	1	5	4
4	0	3	0	21	8	8	4
7	0	0	0	3	3	2	3
6	0	8	8	3	1	2	2

J

RESP	SEX	MARITAL	HEAD	HHSIZE	RESPAGE	SPOUSAGE	RESPED	SPOUSED
67	1	2	1	4	37	35	12	12
69	1	2	1	4	48	44	8	11
70	2	2	2	3	48	48	13	13
72	2	2	2	2	56	60	8	8
75	2	2	2	2	44	49	16	12
76	2	2	2	5	50	52	14	14
77	2	2	2	2	54	55	16	16
101	1	2	1	2	39	24	12	12
106	1	2	1	4	63	56	9	16
108	2	2	2	2	25	25	16	12
111	2	2	2	2	64	68	8	10
112	2	1	1	1	80	88	3	88
113	2	1	1	1	66	88	8	88
114	1	2	1	3	48	46	12	12
116	2	2	2	5	37	39	14	21
117	1	1	1	1	23	88	12	88
118	1	2	1	2	73	70	8	6
81	2	2	2	5	32	35	12	12
82	1	2	1	4	26	27	13	12
87	1	2	1	2	22	22	16	16
88	2	2	2	2	25	23	14	12
89	1	2	1	4	42	38	8	13
91	1	2	1	3	47	51	12	12
92	1	2	1	5	41	38	8	9
93	1	2	1	5	42	37	13	12
96	2	2	2	2	53	56	12	14
97	2	1	1	1	54	88	12	88
98	1	2	1	2	67	65	12	18
100	2	2	2	3	43	44	12	12
121	2	2	2	4	32	34	16	18
123	2	1	1	1	93	88	10	88
125	1	1	1	1	27	88	16	88
126	1	1	1	2	24	88	12	88
127	1	1	1	2	21	88	12	88
128	2	2	2	3	22	22	12	14
130	2	2	2	2	55	62	12	8
138	2	1	1	1	67	88	8	88
140	1	1	1	1	84	88	7	88
143	2	2	2	3	52	65	16	18
144	2	2	2	2	73	74	16	12

ROCCUP	RWORK	SPOCCUP	SPWORK	YRSCOMM	PRERES	WHYMOVE	INCOME
2	0	9	0	4	1	1	4
2	0	9	0	15	1	2	4
9	0	4	0	36	3	3	6
9	0	7	0	11	1	2	3
9	0	5	0	25	1	4	4
3	0	0	0	3	4	2	6
7	1	0	1	54	8	8	4
2	0	7	0	39	8	8	5
5	1	0	0	18	1	2	4
3	0	6	0	1	4	2	4
7	1	5	1	64	8	8	3
9	1	8	8	80	8	8	1
9	1	8	8	2	1	6	2
5	0	9	0	48	8	8	5
9	0	0	0	10	4	2	4
6	0	8	8	23	8	8	4
6	1	9	0	23	1	6	3
9	0	2	0	32	8	8	4
4	0	9	0	1	4	2	5
0	0	0	0	1	3	2	1
8	0	2	0	3	4	4	3
6	0	9	0	11	4	5	5
5	0	5	0	17	1	2	5
5	0	6	0	30	1	3	6
3	0	3	0	21	1	3	3
2	0	2	0	53	8	8	5
4	0	8	8	40	1	6	3
2	1	9	0	67	8	8	4
3	0	2	0	30	1	2	4
0	0	0	0	1	3	2	6
9	0	8	8	93	8	8	1
0	0	8	8	1	2	2	2
5	0	8	8	24	8	8	3
8	0	8	8	21	8	8	3
9	0	0	0	1	1	2	3
3	0	5	0	55	8	8	4
8	1	8	8	67	8	8	2
1	1	8	8	84	8	8	2
7	0	0	1	7	3	2	5
9	0	2	0	40	2	4	9

J

RESP	SEX	MARITAL	HEAD	HHSIZE	RESPAGE	SPOUSAGE	RESPED	SPOUSED
145	1	2	1	2	69	68	8	6
146	2	2	2	3	57	60	16	16
149	1	2	1	2	66	61	12	12
151	2	1	1	1	78	88	8	88
152	2	2	2	3	22	26	14	14
155	2	2	2	3	23	26	12	12
156	2	1	1	1	55	88	12	88
157	2	1	1	1	73	88	8	88
158	1	2	1	4	34	34	14	16
160	1	2	1	2	22	20	12	12
161	2	2	2	3	57	56	8	9
163	2	2	2	6	43	44	8	8
165	1	2	1	5	39	38	12	12
170	2	2	2	2	23	21	16	16
173	2	1	1	1	86	88	7	88
175	1	2	1	2	24	26	16	12
176	1	2	1	2	25	24	16	16
182	1	2	1	4	47	30	16	12
183	2	2	2	4	52	50	13	14
184	1	2	1	2	60	58	12	14
186	1	2	1	5	42	37	12	12
187	2	2	2	4	26	39	14	12
188	2	2	2	4	29	27	16	16
192	1	2	1	2	23	23	16	16
194	1	2	1	2	27	25	12	12
195	2	2	2	4	37	38	12	12
198	1	2	1	2	23	23	12	12
200	1	2	1	4	31	28	12	13
203	2	2	2	6	26	28	12	14

ROCCUP	RWORK	SPOCCUP	SPWORK	YRSCOMM	PRERES	WHYMOVE	INCOME
5	1	9	1	28	1	2	2
0	0	2	0	34	1	4	3
7	1	6	0	66	8	8	4
9	0	8	8	78	8	8	2
9	0	8	0	22	8	8	3
9	0	6	0	23	8	8	3
3	0	8	8	55	8	8	2
9	0	8	8	73	8	8	3
0	0	9	0	12	1	2	4
6	0	3	0	3	1	5	4
5	0	5	0	57	8	8	2
9	0	5	0	43	8	8	9
7	0	7	0	39	8	8	4
3	0	0	0	2	3	2	2
9	1	8	8	86	8	8	1
7	0	2	0	5	4	5	3
5	0	2	0	2	4	2	3
4	0	3	0	20	4	2	4
2	0	6	0	8	2	2	5
2	0	9	0	10	1	2	5
2	0	6	0	42	8	8	9
6	0	5	0	24	4	5	3
9	0	0	0	3	3	2	3
0	0	0	0	1	3	2	3
6	0	9	0	3	1	2	4
7	0	6	0	4	1	2	3
6	0	6	0	23	8	8	4
5	0	9	0	31	8	8	3
9	0	5	0	1	2	2	3

K

RESP	SEX	MARITAL	HEAD	HHSIZE	RESPAGE	SPOUSAGE	RESPED	SPOUSED
2	1	2	1	2	75	77	10	8
3	2	2	2	3	55	54	12	8
4	2	2	2	4	27	27	12	12
8	1	2	1	5	45	45	14	15
9	1	2	1	8	41	38	18	15
11	2	1	1	1	76	88	13	88
14	2	2	2	5	29	30	12	13
17	1	2	1	2	50	50	14	15
18	2	2	2	4	33	35	12	12
20	1	2	1	2	80	78	7	8
22	2	2	2	5	31	37	12	12
23	2	2	2	4	47	47	12	12
26	2	2	2	3	47	49	12	8
28	2	2	2	2	64	69	10	12
30	2	2	2	3	55	56	12	12
33	1	1	1	1	84	88	8	88
34	1	2	1	2	82	73	19	12
35	1	2	1	4	23	22	12	13
36	2	2	2	4	29	32	13	20
37	2	2	2	6	40	39	16	16
40	2	1	1	1	66	88	12	88
43	1	2	1	8	45	40	12	12
45	2	1	1	1	80	88	11	88
46	2	1	1	1	71	88	14	88
48	2	1	1	1	77	88	10	88
50	1	2	1	5	36	30	11	12
52	1	2	1	2	61	60	8	10
53	1	2	1	3	65	61	8	8
58	1	2	1	2	62	61	8	8
59	1	2	1	2	66	65	8	9
61	1	2	1	7	40	39	13	12
63	2	2	2	2	78	80	8	8
64	2	2	2	3	40	40	12	8

ROCCUP	RWORK	SPOCCUP	SPWORK	YRSCOMM	PRERES	WHYMOVE	INCOME
2	1	9	0	70	5	3	1
3	0	4	0	16	1	4	3
9	0	0	0	27	8	8	2
0	0	9	0	18	3	2	6
9	0	0	0	14	4	5	4
9	0	8	8	76	8	8	2
9	0	2	0	3	1	2	4
2	0	3	0	50	8	8	6
9	0	2	0	15	1	2	5
7	1	9	0	52	1	2	2
9	0	6	0	14	1	2	4
9	0	0	0	2	2	2	5
0	0	6	0	25	1	2	3
9	0	1	1	64	8	8	3
5	0	2	0	6	4	2	4
1	1	8	8	84	8	8	1
0	1	0	1	82	8	8	2
5	0	9	0	4	1	2	4
9	0	0	0	5	3	2	9
9	0	2	0	15	4	5	9
3	0	8	8	28	1	3	3
2	0	9	0	26	2	2	4
9	0	8	8	3	3	6	4
0	1	8	8	4	3	6	2
9	0	8	8	10	1	6	2
5	0	9	0	15	3	5	3
2	0	9	0	6	1	1	4
6	1	7	1	7	1	5	2
5	0	9	0	18	1	2	2
5	1	9	0	66	8	8	2
1	0	9	0	4	3	2	3
9	0	2	1	78	8	8	2
9	0	5	0	1	2	2	3

L

RESP	SEX	MARITAL	HEAD	HHSIZE	RESPAGE	SPOUSAGE	RESPED	SPOUSED
1	1	2	1	3	59	57	11	12
5	2	2	2	4	28	32	12	16
6	2	2	2	2	52	57	14	8
7	2	2	2	2	59	60	16	10
10	2	2	2	4	50	55	13	20
12	1	2	1	2	67	66	8	8
13	2	2	2	3	50	53	13	17
15	1	2	1	3	34	32	12	12
16	2	1	1	1	65	88	13	88
19	2	2	2	3	30	30	16	12
21	1	2	1	2	86	81	8	12
24	2	2	2	2	28	28	14	18
25	2	1	1	1	71	88	6	88
27	2	2	2	6	38	38	12	8
29	2	1	1	1	78	88	8	88
31	1	2	1	3	24	22	15	12
32	1	2	1	4	47	43	16	14
38	2	1	1	1	73	88	14	88
39	1	2	1	2	82	78	8	5
41	1	2	1	4	33	28	12	12
42	1	2	1	2	74	66	16	12
44	2	2	2	2	67	75	8	6
47	2	1	1	1	83	88	14	88
49	1	2	1	4	31	27	12	16
51	1	2	1	4	46	48	8	12
54	2	2	2	2	65	62	16	13
55	2	2	2	4	50	52	12	12
56	2	2	2	3	54	55	14	12
57	2	1	1	1	74	88	8	88
60	2	2	2	7	35	40	12	12
62	1	1	1	1	69	88	6	88
65	2	2	2	5	36	36	12	12
66	2	1	1	1	71	88	8	88

ROCCUP	RWORK	SPOCCUP	SPWORK	YRSCOMM	PRERES	WHYMOVE	INCOME
2	0	9	0	30	2	1	6
9	0	3	0	6	3	5	4
2	0	2	0	52	8	8	3
0	0	1	1	59	8	8	3
9	0	0	0	18	4	4	6
1	1	9	0	67	8	8	2
2	0	0	0	2	4	6	3
7	0	4	0	3	1	2	3
3	0	8	8	41	1	2	2
9	0	5	0	6	1	2	3
1	0	9	0	23	1	2	1
4	0	0	0	1	4	2	4
9	0	8	8	9	1	6	1
9	0	8	0	38	8	8	3
9	0	8	8	15	1	5	1
2	0	4	0	24	8	8	3
4	0	9	0	11	3	2	5
2	1	8	8	48	2	4	4
8	1	9	0	82	8	8	2
6	0	9	0	33	8	8	3
0	1	9	0	18	5	2	3
7	0	2	1	4	1	2	2
9	0	8	8	63	4	4	3
2	0	9	0	5	3	5	3
8	0	7	0	26	1	3	3
0	1	2	0	12	1	2	3
3	0	2	0	23	1	1	5
9	0	7	0	29	1	4	3
7	1	8	8	13	1	6	1
9	0	5	0	15	1	2	3
5	1	8	8	69	8	8	2
7	0	4	0	4	2	2	3
9	0	8	8	16	1	6	2