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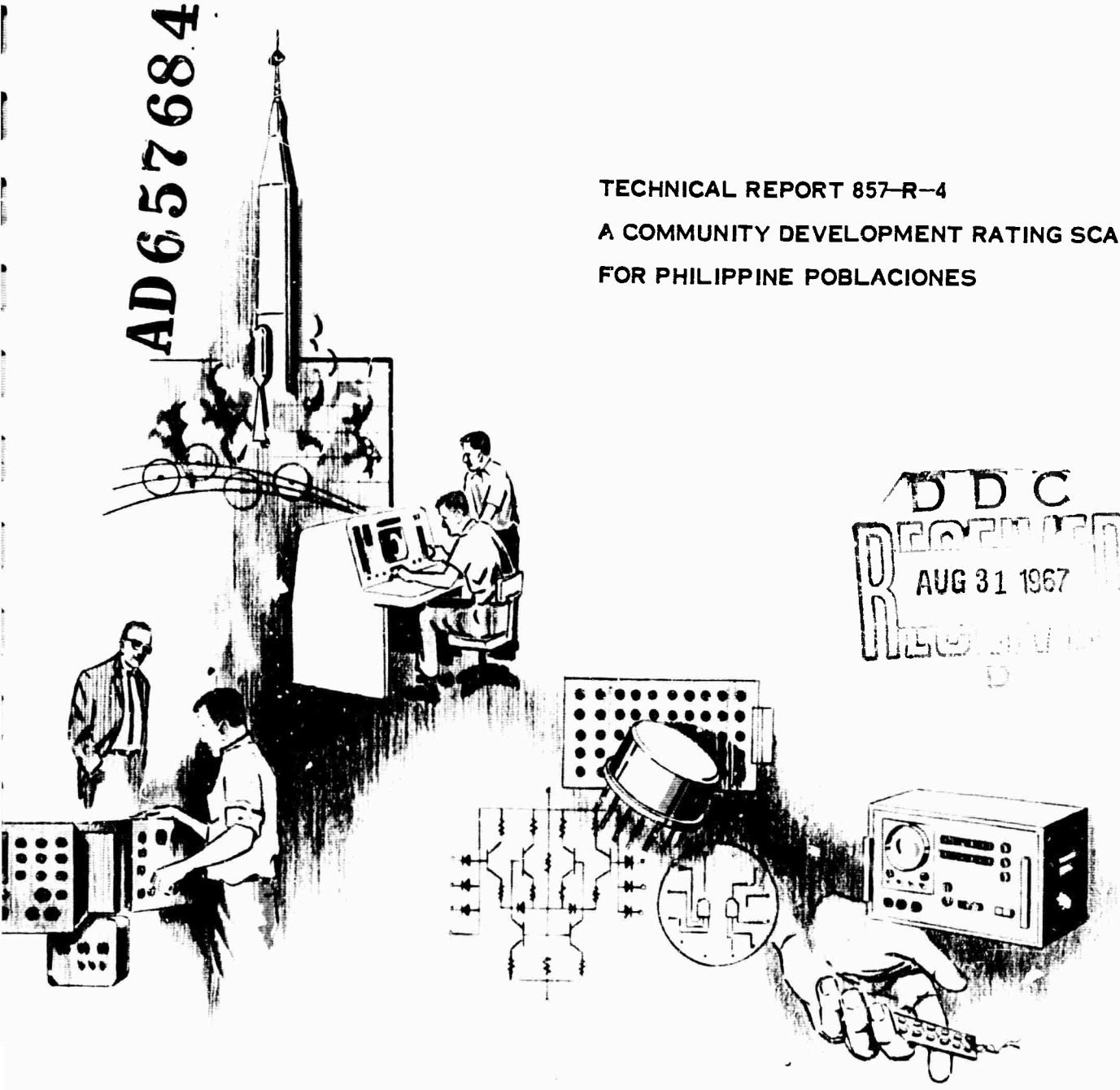

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A COMMUNITY DEVELOPMENT RATING SCALE FOR PHILIPPINE POBLACIONES

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(VIEWS EXPRESSED ARE THOSE OF THE AUTHORS AND DO NOT NECESSARILY REPRESENT THOSE OF THE DEPARTMENT OF DEFENSE.)

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EXECUTIVE SUMMARY

This paper is concerned with the extent to which a simple rating of the number and type of facilities present in a Poblacion (a population center in a municipality) can be used as an index of that community's level of development. Special attention was given to the accuracy with which one could infer on the basis of the existence of less frequently seen facilities (such as the presence of a hotel, a public telephone, hospital, park, movie theater, piped water, shoe repair shop, bank, newspapers for sale, and electricity) that the community also had facilities more frequently seen (a municipal building, police force, paid municipal secretary, post office, church, dry goods store, market, resident M. D., plaza, high school, and gas station). Data were collected from 209 Poblacions in the seven Tagalog (basic dialect) speaking provinces of Luzon, Republic of the Philippines. Fujimoto's list of twenty-one facilities studied on the island of Mondoro was used in the survey.

Results showed clear and consistent trends. A generalized scale of development was devised which had 96 percent reproducibility; i.e., from knowing the total score, one could tell with 96 percent accuracy which of the twenty-one facilities a town had and which ones it did not. Data were highly consistent in all seven provinces; and, with a few exceptions they were consistent with Fujimoto's findings. These results indicate that it is possible to develop a useful scale of community development, as indicated by the presence or absence of selected facilities readily subject to objective observation. Further, it appears possible to devise a scale for the entire Philippines.

One of the advantages of such a scale is to define unambiguously what level of development a specific place has reached a feature which makes assessment of level of development less a matter of expert judgment and susceptible to

impartial observation by comparatively untrained personnel. Another is that it should facilitate the ease with which one can generalize results of one study to a new situation. In other words one can provide a baseline of comparison by which it is possible to interpret results of different studies and to more readily speculate when one set of findings may be applicable to a new set of conditions. The third advantage is that the data suggest an evolutionary pattern of community development, with discernible guideposts by which it is possible to assess the impact of specific community development programs. Therefore, it is possible for people who are not experts in community development to ascertain if programs of planned social change are having any discernible impact. Also, it is possible to use similar techniques to determine if development in a new area of interest tends to follow some orderly, predictable pattern--even though it may be different fro the one discussed here.

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INTRODUCTION

Experimentation in empirical sciences is generally aimed at demonstrating the validity -- or inadequacy -- of a particular point of view. Usually, the idea being tested is phrased in terms of a hypothesis having observable implications, a procedure which makes it at least partially subject to confirmation. In behavioral sciences the way in which ideas are tested is standardized to a certain extent by frequent use of statistical hypothesis testing techniques, e.g., null hypothesis testing, statistical decision rules, etc. No matter what particular demonstration vehicle is employed by the experimenter, however, his intent remains the same; namely, to gain support for a contention which has implications in the real world.[1]

When an experimenter is interested in testing the validity of hypotheses concerning the process of economic and social development, procedures employed are of two general types: (1) manipulative and (2) selective controlled field studies. To illustrate the first case, consider a situation where attention is focused upon the relative efficiency and effectiveness of various communications techniques aimed at producing changes in attitudes or behavior -- hopefully, in a direction consistent with a higher level of development. Here, the experimenter can decide at random which groups of people will be exposed to certain types of experimental communications procedures and which ones will serve as controls. Observed changes in attitudes or behavior can then be associated with the ideas under examination to determine the extent to which expectations have been supported.

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[1] In rational sciences the goal is not the same since logical consistency is an end in itself. Examples of rational sciences are philosophy and mathematics. In empirical sciences logical consistency is demanded as well as correspondence between a set of concepts and objects in the real world.

A much more common situation in developmental research is the case when the experimenter performs his manipulations and controls by studying carefully selected groups matched with respect to characteristics he wishes to hold constant and disparat with respect to characteristics he wishes to study. For example, consider a situation where there is an interest in measuring the attitudinal and behavioral impact of broad social forces. Here, there is litt.e recourse but to select groups of people who have been exposed to various levels and combinations of the forces under scrutiny. By contrasting specific responses of different groups which are gathered in a naturalistic setting, inferences are drawn concerning the nature and extent of the impact of various social forces, e. g., social change and social status.

In both types of experimental situations described above, but especially so in the second cas , it is extremely helpful to have a clear quantifiable definition of major phenomena involved in the investigation. If such indices are available, it is much easier to bolster the contention that matching has been accomplished satisfactorily or that manipulations of a given order of magnitude have been performed. Also, measures serve the useful function of specifying unambiguously what the experimenter means by the use of certain terms, not to mention reducing the amount of subjectivity inherent in selecting specific communities to study. All of these features make research findings easier to relate to one another and easier to generalize from one situation to another.

Advantages described above would appear to provide ample justification for attempting to introduce objective measures or indices of important social forces. The goal of this research was to investigate the feasibility of providing a simplified checklist by which it is possible to assess rapidly the relative level of development of a set of communities by noting whether or not certain facilities were present.

The two hundred and nine communities studied were Poblacions[2] in the seven provinces on the island of Luzon, Republic of the Philippines, where Tagalog was the major dialect.[3] Specific provinces studied, and the number of communities reviewed in each are provided in Table 1.

PROVINCE:	Number of Communities
BATANGAS	30
BULACAN	24
CAVITE	22
LAGUNA	30
NUEVA ECIJA	30
QUEZON	44
RIZAL	29
Total	209

Table 1: List of Provinces and the Number of Communities Studies in Each Province.

[2]A Poblacion is the major population center in a municipality. There are several municipalities in a province. Thus, the province is roughly equivalent to a state, the municipality to a county, and a Poblacion to a county seat in the U. S. A.

[3]Tagalog is the major dialect in central Luzon. Officially, it is also the basic dialect in the Philippines. Actually, however, Cebuano is spoken by more people, and Ilocano is spoken as frequently as Tagalog.

DEVELOPMENTAL RATING SCALES

From a methodological standpoint, numerical checklists, which represent one form of rating scales, fall into two basic classes: (1) multidimensional and (2) unidimensional. In the first case, interest is concentrated on a set of attributes or characteristics which usually tap several independent or loosely related aspects of development. Often, no particular attention is given to matters concerning the exact number of dimensions being reviewed, the number of attributes considered on each dimension, and a precise definition of the interrelationship between dimensions. However, despite the fact that there may be no empirical evidence that a given rating form is multidimensional in nature, unless specific steps are taken to insure unidimensionality, multidimensionality is the usual consequence. Alsowhen one attempts to tap most of the many aspects of development, multidimensionality ratings would appear to be the logical result.

Unidimensional rating scales, on the other hand, are the product of specific actions taken to insure that all characteristics being considered relate to a common underlying dimension. Typically, there are two methods of insuring that this condition is satisfied: factor analysis (Thurstone,1936) and Guttman (1951) scaling. In factor analysis an intercorrelation matrix is constructed showing the relationship between attributes; later, it is examined to determine the smallest number of underlying dimensions one needs to consider before he can adequately reproduce the matrix. In the Guttman scaling technique, the criterion is that all items on the checklist form an ascending series of orders of magnitude along a given dimension. For example, a person who has twenty dollars is certain to have ten dollars, etc.

In this section there is an interest in discussing how both techniques have been used to obtain ratings of levels of development. The discussion is concerned with the context of application along with a discussion of principal features of the approach employed in this study. The latter material will serve to illustrate key points to someone not experienced in interpreting results from the use of various scaling techniques.

Multidimensional Developmental Rating Scales: Several multidimensional rating scales of economic development have been devised in the past. Usually, they are used as part of an evaluation of specific rural assistance programs. The work of Dobyns, Doughty, and Holmberg (1966) serves as an interesting example of this approach. Their goal was to measure the impact of the Peace Corps program in the Peruvian Andes. The technique employed was to start with a locally meaningful basis of comparison to contrast with the level of development of certain communities. Lima was selected for this purpose. It was decided that a rating of all major facilities available in Lima would yield a score of one hundred. Following a rating procedure devised by Kunkel (1961), a revised version was produced which was more applicable to Peruvian settlements. The final format had nine items under the heading of Governmental Structure, nine under Educational Structure, six under Religious Structure, fourteen under Basic Community Services, eight under Communications Facilities, five under Health Facilities, seven under Mass Media Facilities, two under Credit Structure, six under Industrial Structure, five under Commercial Recreation Facilities. twenty-five under the heading Commercial Differentation, and four under a Miscellaneous category.

Once the scale was devised, it was used to evaluate the impact of the Peace Corps program aimed at raising the level of community development. The evaluation was performed by the traditional method of pre- and post-measurements. That is, communities in areas where Peace Corps volunteers were working were rated in 1962 when the volunteers first arrived and again, independently, in 1964. By contrasting the two measures, an indication of the impact of the Peace Corps program was devised.* The process followed by Dobyns et al., allowed quantifiable estimates of levels of development to be made along with parallel considerations, such as ascertaining the rate of change in community development over time, and computation of measurable indices of impact of a particular community development program.

A similar approach has been devised by the Philippine Rural Reconstruction Movement located in the province of Nueva Ecija on Luzon. The general categories in their rating-form version, dated 4 January 1966, included the following: cleanliness and general appearance of community, existence of model form families, plant production level, existence of cooperatives, frequency of supplemental income projects and public works, health and sanitation level, educational level, degree of self-government, etc. One hundred points were assigned in each of nine such areas. These were averaged and a general score was given over each successive calendar quarter. Before scores were recorded officially, certification by technical experts were required, independent of the certification of the rating team captain and his assistants.

Additional rating scales have been devised by organizations such as the Presidential Arm on Community Development (PACD) in the Philippines. As was the case for the two examples discussed in detail above, however, all appear to have three major characteristics. First, they are basically a series of interrelated checklists covering topics which when considered collectively are

*To the authors' knowledge no attempt was made to partial out the effect of general modernization by use of pre- and post-measures on similar communities where Peace Corps representatives were not present.

judged to represent numerous aspects of development. Second, their use is usually confined to assessing the import of specific community development projects. Third, in addition to computing scores in a series of separate areas (which could lead to a profile analysis), an overall index of development is computed as well.

Unidimensional Developmental Rating Scales: The major problem associated with multidimensional rating scales is that the same score, which in this case represents an overall index of development, can be reached in a variety of ways. For example, communities X and Y may have the same overall score and still be considerably different: one could rate high on matters of health and sanitation and low on agricultural diversity, while the opposite could be true in the other town. It is just this set of circumstances which tends to make overall scores from multidimensional scales more ambiguous than scores from unidimensional scales and more subject to spurious variation over time (they are less reliable in the psychometric sense).

In all fairness, however, it should be mentioned that the chief concern of any measure is its validity, i.e., the extent to which a score represents what it purports to represent. While one can expect, in general, that no measure can relate to anything else better than it relates to itself over time, a measure yielding consistent, highly reliable, results--no matter who uses it or when the measures are taken,--does not necessarily imply that it is a valid index of development. At the same time, however, one should not overlook the advantages associated with being able to produce unambiguous, highly reliable scales for measuring at least a portion of the features generally associated with development. Later, if one wished, a series of such scales could be used in combination to yield a more comprehensive profile of development progress.[4] In any event, the investigator would have the obvious advantage of having an accurate measuring device at his disposal.

It would, therefore, appear useful to devise a clearly unidimensional rating scale of social progress. One such attempt was made by Fujimoto (1965) when he devised a Guttman-type scale of development for Philippine communists. By checking whether or not a series of community features were present, e.g., a resident M.D. and, newspapers for sale, one could ascertain whether one community was at a higher or lower level of development than another. Briefly, the Guttman (1950) criterion

[4]Although the question has received little direct attention, there appear to be different schools of thought concerning the extent to which development is a generalized concept. Managers of some programs evidently feel that a generalized community development continuum exists as evidenced by their belief that in order for community development projects to succeed, parallel efforts must be made simultaneously along paths of health and sanitation, agricultural diversification, growth of lending agencies, etc. The existance of other special programs, such as assistance in health and sanitation and agriculture, indicate that this belief is not universal, however.

is as follows. Assume that ten features of development in a community are arranged in a high to low order. Guttman felt that if a community really belonged at level seven, it would have all of the features of communities at levels one through six and something else as well, namely feature seven.

The key feature of a Guttman scale is the amount of precise information it yields. For example, if someone says that community Y is at level four, the listener can then infer what features are present. That is, simply by knowing the total score, it is possible to reproduce the pattern or profile of characteristics relevant to that scale; e.g., features 1, 2, 3, and 4 will be present while features 5, 6, 7, 8, 9, and 10 are absent. Guttman termed this feature the reproducibility criterion. Of course, in behavioral sciences, errors of measurement can be expected. Therefore, the question becomes one of how much reproducibility should be demanded and how much error can be tolerated. Guttman arbitrarily set the standard at ninety percent reproducibility.

Figure 1 illustrates the pattern of characteristics found in a perfectly reproducible scale. To simplify the point, the scale deals with a scale of household conveniences present in a series of twelve household options available to a potential buyer. In the case of the scale of interest to this research, communities take the place of the houses available, and observable community characteristics take the place of the list of household conveniences. This same figure also serves to illustrate a point made by Green (1954): The reproducibility coefficient by itself does not yield sufficient data to infer the existence of a unidimensional scale. For example, one would expect that errors, when they did occur, appeared randomly and were not tightly grouped around certain communities and certain community features.

The major point made by Green is more subtle, however. Recall that the task is to infer if a series of specific features are present or absent. In Figure 1 their presence was designated by a one and their absence by a zero. Presumably, knowledge of the scale is what permits one to successfully reproduce the pattern of characteristics available in a group of communities. But knowledge of the scale isn't the only way that one can succeed in this task, however. Luck enters into the situation as well, especially when one additional item of information is available which has little to do with specific knowledge concerning the scale. This item is whether or not more or less than 50% of the communities have such features. If less than 50% have them on the average, one can produce a pattern of responses guaranteed to have higher than 50% reproducibility simply by assuming that no community has any of these features.

If only ten percent of the communities have any of these features (or if only 10% of these features are found in any community), one would achieve the 90% reproducibility criterion simply by following this maximally effective guessing strategy.[5] Conversely, if someone knows that the complete list of features appears in 90% of the communities, by simply guessing that all features are found in all communities (filling in the matrix with ones), he can achieve 90% reproducibility. The relationship between such general information and reproducibility is shown in Figure 2. Obviously, Guttman did not wish to include such gross guessing strategies in his determinations of reproducibility. Therefore, one should attempt to eliminate this potential source of bias.

The simplest way of eliminating such bias is to provide additional data. For example, it should now be apparent that the case in which only 50% of the community features are known to be present in communities is the one which yields the lowest minimal reproducibility; that is, if one has to resort to guessing without knowledge of the scale. This case is shown in Figure 1, which for our purposes, now becomes an illustration of a perfect scale: here, only 120 of the 240 cells have zeros or ones. If someone had to resort to guessing, only a 50% reproducibility would result; i.e., he would probably be in error on 120 of 240 occasions. Therefore, as a general rule, one can simply contrast the number of errors in assigning zeros or ones which was observed with the number of errors in assignment if one were following a maximally effective guessing strategy. The difference between the two scores can

[5] For someone unfamiliar with maximization strategies in binary decision-making situations, it may not be obvious that sticking to the same guess, no matter what the situation, is the best strategy. If the pattern of deviations (errors) from the scale is random, however, the strategy suggested in Figure 2 is maximally effective. For example, assume that 80% of the community features are known to be present in all communities. If one is inserted in each cell, the success probability becomes [.8 (20)] or 16 out of 20, which yields a reproducibility coefficient of .80, or 80% -- however, one chooses to express it. If, however, a one is inserted on 80% of the occasions, and a zero on the other 20%, the success probability is [16(.8) + 4(.2)] or 15.6 expected successes out of twenty guesses, as opposed to the 16 out of twenty obtained above.

LIST OF HOUSES AVAILABLE	LIST OF HOUSEHOLD CONVENIENCES											
	1	2	3	4	5	6	7	8	9	10	11	12
20	1	1	1	1	1	1	1	1	1	1	1	1
19	1	1	1	1	1	1	1	1	1	1	1	0
18	1	1	1	1	1	1	1	1	1	1	0	0
17	1	1	1	1	1	1	1	1	1	1	0	0
16	1	1	1	1	1	1	1	1	1	1	0	0
15	1	1	1	1	1	1	1	1	1	1	0	0
14	1	1	1	1	1	1	1	1	1	0	0	0
13	1	1	1	1	1	1	1	1	1	0	0	0
12	1	1	1	1	1	1	1	0	0	0	0	0
10	1	1	1	1	1	1	1	0	0	0	0	0
9	1	1	1	1	1	1	0	0	0	0	0	0
8	1	1	1	1	0	0	0	0	0	0	0	0
7	1	1	1	1	0	0	0	0	0	0	0	0
6	1	1	1	1	0	0	0	0	0	0	0	0
5	1	1	0	0	0	0	0	0	0	0	0	0
4	1	1	0	0	0	0	0	0	0	0	0	0
3	1	1	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0

FIG. 1 SIMPLIFIED ILLUSTRATION OF A GUTTMAN-TYPE UNIDIMENSIONAL SCALE HAVING PERFECT REPRODUCIBILITY (100%). A ONE INDICATES THE PRESENCE OF A FACILITY AND A 0 ITS ABSENCE

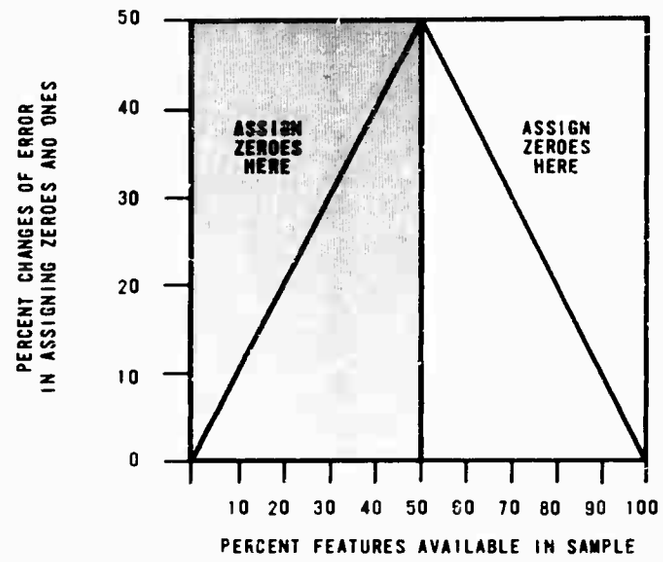

FIG. 2 ILLUSTRATION OF THE INFLUENCE OF GENERALIZED ITEM POPULARITY ON THE COEFFICIENT OF REPRODUCIBILITY. SHADED PORTION INDICATES CASE WHERE STRATEGY IS TO ASSIGN ALL ZEROES WHILE STRATEGY IN WHITE AREA IS TO ASSIGN ALL ONES.

be tested for statistical significance by conventional X^2 analyses. Also, one can test the extent to which the number of errors observed exceeded or fell short of expectations introduced by an arbitrary accuracy standard. The one used here was 90% accuracy over and above the reproducibility which could be obtained by following a sophisticated guessing strategy.

METHOD

As stated previously, all of the two hundred and nine municipalities studied were located in seven Tagalog-speaking provinces of central and southern Luzon enumerated in Table 1.[5] The Institute of Philippine Culture of the Ateneo de Manila University at Loyola Heights, Quezon City, served as a base for field operations. Five interviewers were sent to the seven provincial capitals where they interviewed from three to five people familiar with the facilities present in each of the municipalities in the province. The group of "key informants" interviewed included municipal government officials, agricultural and health extension workers, public school supervisors, regional bus inspectors, post-masters, priests whose responsibilities spanned the province, etc. In most cases, there was complete agreement among the key informants concerning the presence of absence of facilities of interest in each municipality. In a few cases, however, inconsistent responses were received. When this occurred, the interviewer collected data from additional people until the uncertainty was resolved.

The list of facilities studied was assembled by expropriating the entire series of items in Fujimoto's (1965) checklist. In his study, he provided a list of features in municipalities on the island of Mindoro which satisfied the requirements of a Guttman scale. That is, when communities were arranged on one axis of a matrix and facilities on the other, the familiar stair-step pattern shown in Figure 1 emerged; certain communities had all of the features up to a point beyond which those features which were noted less often in general, rarely appeared in one group of communities and usually appeared in another group. Determinants of community differentiation in Fujimoto's final Guttman scale were in the following ascending order: (the

[5] For all practical purposes, these seven provinces constitute the entire population of provinces in the Philippines where Tagalog is the major dialect for the majority of people.

presence of a) (1) post office, (2) police force, (3) paid municipal secretary, (4) municipal building, (5) resident doctor, (6) market, (7) plaza, (8) dry goods store, (9) gasoline station, (10) high school, (11) newspapers for sale, (12) churches, (13) electricity, (14) hotel, (15) shoe repair shop, (16) piped water, (17) movie house, (18) park, (19) bank, (20) hospital, and (21) public phone.

The same twenty-one features were used in the present study. Based upon an analysis of data from key informants, separate scales were constructed for each province in a manner which maximized the reproducibility coefficient for that province (Edwards, 1957). That is, on a trail and error basis, the rank orders of features and communities were adjusted so as to minimize the number of deviations from the overall scale pattern. Later, a comparison was made across all seven provinces to determine the extent to which the scales agreed. The final step involved producing a scale to cover all seven provinces and all 209 municipalities. This was done by a process of averaging described below. In all likelihood, this averaging procedure did not maximize the reproducibility of the overall scale.[6] However, this procedure was felt to be reasonable since, in all likelihood, readjusting items and communities in a manner to maximize reproducibility produces an inflated index.

Coefficients of reproducibility were computed in each province by the use of Equation (1).

$$C.R = 1 - \frac{\text{No. of deviations from scale pattern}}{\text{No. of municipalities} \times \text{No. of facilities}} \qquad (1)$$

The coefficient of reproducibility, C.R., can be converted to a percentage figure by multiplying by 100.

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[6] The reason that this comment is made with reservations is that to the author's knowledge maximizing reproducibility is accomplished by an iterative process. Although there would appear to be a rational unique solution, if it exists, it fails to appear in most texts discussing Guttman scaling procedures.

To arrive at a generalizable rank order scale of facilities across all seven provinces, the following procedure was used: First, the relative frequency with which each of the 21 facilities appeared in each of the seven provinces was computed by simply contrasting the number of municipalities which had each feature to the total number of municipalities present in each province. By multiplying by 100, this figure was also converted to a percentage. Second, adding scores for all seven provinces and dividing by seven, a general average was computed for each of the 21 facilities. These general averages were then ranked to produce an overall scale applicable to all communities in all seven provinces.[7]

To test the overall reproducibility of this scale, a random sample of thirty-nine communities was drawn from the total of 209 without regard to province. These communities were then examined with respect to the overall scale produced by the averaging process described above. While this method of demonstrating the reproducibility of the final scale fell short of the independence found in a completely separate cross validation using entirely new communities whose features had not been tabulated previously, it was probably not as biased as the case when one does everything to maximize reproducibility and arrives at a figure which almost certainly will drop in later cross-validation studies.

Another feature of the method of investigation involved conducting X^2 tests to determine two things: first, if the reproducibility observed was significantly greater than what would result from following a maximally effective guessing strategy where one knows nothing about the scale (a semisophisticated chance reproducibility estimate, the nature of which was demonstrated in Figure 2); and,

[7] Again, as stated previously, no attempt was made to maximize reproducibility; for if this were attempted, one would weigh each province average by the number of communities present in that province.

second, if the reproducibility observed was 90 percent better than the reproducibility which could be obtained by sophisticated guessing. Thus, the two tests were similar in kind and different in degree, the major difference being that the second was a much more difficult criterion than the first. A third computation described the extent of the observed improvement over a sophisticated guessing strategy.

Scales for Individual Provinces

Matrices of the type shown in Figure 1 are provided in Figures 3 through 9 -- one for each of the seven provinces studied. In each case the ordering of communities and facilities was rearranged by hand until the deviations from a perfect scale pattern were minimized. Each deviation from a perfect scale pattern is shown by a shaded cell in the matrix. A visual inspection of the seven matrices shows these errors were distributed in a semirandom fashion. This finding indicates that no single community or facility was causing most of the errors. Also, as can be readily seen, error rates were low.

Reproducibility coefficients computed by use of Equation 1 were as follows: 97.5% for the 30 communities in Batangas; 97.5% for the 24 communities in Bulacan; 96.5% for the 22 communitiesin Cavite; 98% for the 30 communities in Laguna; 99.6% for the 30 communities in Nueva Ecija; 93% for the 44 communities in Quezon; and 96% for the 30 communities in Rizal. All of these figures substantially exceed those of the 90% criterion suggested by Guttman. Therefore, in each province, it appears possible to construct unidimensional rating scales of development -- according to the Guttman criterion.

But, it should be recalled, other evaluative criteria were employed as well. Undoubtedly, all of these reproducibility figures are substantially better than the 50% reproducibility which would result if someone tossed a coin to provide an answer to the question "is feature X found in Walawala?" The next question was the extent to which reproducibility exceeded results which could be obtained

	MUNICIPAL BUILDING	POLICE FORCE	PAID MUN. SECRETARY	POST OFFICE	RESIDENT DOCTOR	HIGH SCHOOL	CHURCHES	DRY GOODS STORE	PLAZA	NEWSPAPER SOLD	MARKET	BANK	GAS STATION	PIPED WATER	ELECTRICITY	HOSPITAL	SHOE REPAIR SHOP	PUBLIC PHONE	MOVIE HOUSE	HOTEL	PARK
LIPA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
BATANGAS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TANAUAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
LEMERY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
BALAYAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
NASUGBU	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
BAUAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
LIAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
STO TOMAS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
TAYSAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0
CALACA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0
PADRE GARCIA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0
SAN JOSE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
TUY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
TAAL	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
LOBO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0
ROSARIO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0
SAN JUAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0
MALVAR	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	0	0	0	0
ALITAGTAG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0
TALISAY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0
CUENCA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
MATAAS NA KAHOY	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0
IBAAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
SAN LUIS	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0
MABINI	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
SAN NICOLAS	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
CALATAGAN	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
AGONCILLO	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0
TINGLOY	1	1	1	1	1	1	1	1	0	0	1	0	0	1	0	0	0	0	0	0	0

FIG. 3 RESULTS OF ATTEMPTS TO SCALE FACILITIES OF 30 COMMUNITIES IN BITANGAS PROVINCE. SHADED CELLS SHOW DEVIATION FROM A PERFECT SCALE PATTERN (A 1 INDICATED PRESENCE OF A FACILITY AND A 0 ITS ABSENCE).

	MUNICIPAL BUILDING	POLICE FORCE	PAID MUN. SECRETARY	POST OFFICE	RESIDENT DOCTOR	DRY GOODS STORE	GAS STATION	CHURCHES	MARKET	ELECTRICITY	NEWSPAPER	PLAZA	SHOE REPAIR	BANK	PARK	HIGH SCHOOL	PIPED WATER	MOVIE HOUSE	HOSPITAL	PUBLIC PHONE	HOTEL
MALOLOS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
BOCAUE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
BALIUAG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
SAN MIGUEL	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	
STA. MARIA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
VALENZUELA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	0	
HAGONOY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0		0
BULACAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	
MEYCAUAYAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0		0
OBANDO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
CALUMPIT	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
BIGAA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
PLARIDEL	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
SAN JOSE DEL MONTE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
NORZAGARAY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
PAOMBONG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
SAN ILDEFONSO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
PANDI	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
ANGAT	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
BUSTOS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
MARILAO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	0	0
PULILAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0
GUIGUINTO	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	0	0	0	0
SAN RAFAEL	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0

FIG. 4 RESULTS OF ATTEMPTS TO SCALE FACILITIES OF 24 COMMUNITIES IN BULACAN PROVINCE. SHADED CELLS SHOW DEVIATIONS FROM A PERFECT SCALE PATTERN (A 1 INDICATES A FACILITY IS PRESENT WHILE A 0 INDICATES ITS ABSENCE).

	MUNICIPAL BUILDING	POLICE FORCE	PAID MUN. SECRETARY	POST OFFICE	PLAZA	CHURCHES	ELECTRICITY	MARKET	DRY GOODS STORE	NEWSPAPER SOLD	HIGH SCHOOL	RESIDENT DOCTOR	GAS STATION	BANK	PARK	SHOE REPAIR SHOP	PUBLIC PHONE	PIPED WATER	MOVIE HOUSE	HOSPITAL	HOTEL
CAVITE CITY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
IMUS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
SILANG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
BACOOR	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
NOVELETA	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	0	1	1	0	0
INOANG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
KAWIT	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
ROSARIO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1
NAIC	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0
CASMARINAS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
TANZA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0
GEN. TRIAS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
MARAGONDON	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
ALFONSO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
TAGAYTAY CITY	1	1	1	1	1	1	1	0	1	1	1	0	1	1	0	0	0	0	0	0	1
MENDEZ -- NUNEZ	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
AMADEO	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
MAGALLANES	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
TRECE MARTIRES	1	1	1	1	1	1	1	1	0	1	0	1	0	0	1	0	1	0	0	1	0
BAILEN	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
CARMONA	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
TERNATE	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0

FIG. 5 RESULTS OF ATTEMPTS TO SCALE FACILITIES OF 22 COMMUNITIES IN CAVITE PROVINCE. SHADED CELLS SHOW DEVIATION FROM A PERFECT SCALE PATTERN. (A 1 INDICATES PRESENCE OF A FEATURE AND A 0 ITS ABSENCE).

	MUNICIPAL BUILDING	POLICE FORCE	PAID MUN. SECRETARY	POST OFFICE	MARKET	PLAZA	CHURCHES	PIPED WATER	ELECTRICITY	RESIDENT DOCTOR	DRY GOODS STORE	GAS STATION	HIGH SCHOOL	BANK	SHOE REPAIR SHOP	NEWSPAPER SOLD	PUBLIC PHONE	PARK	MOVIE HOUSE	HOSPITAL	HOTEL
BINAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CALAMBA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
LOS BANOS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
NAGCARLAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PAKIL	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
SAN PABLO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
STA. CRUZ	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CALAUAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
BAY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0
PAGSANJAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
SINILOAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
CABUYAO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
MABITAC	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
KALAYAAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0
LILIO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
LUMBAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
PILA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0
STA. ROSA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0
PANGIL	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0
ALAMINOS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0
SAN PEORO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1
PAETE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0
MAJAYJAY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
CAVINTI	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	0	0	0	0	0
MAGDALENA	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0
RIZAL	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	0	0	0	0	0
STA. MARIA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
LUISIANA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
VICTORIA	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0	0
PAMY	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0

FIG. 6 RESULTS OF ATTEMPTS TO SCALE FACILITIES IN 30 COMMUNITIES IN LAGUNA PROVINCE. SHADED CELLS INDICATE DEVIATION FROM A PERFECT SCALE PATTERN (A 1 INDICATES A FACILITY IS PRESENT WHILE A 0 INDICATES ITS ABSENCE).

	MUNICIPAL BUILDING	POLICE FORCE	PAID MUN. SECRETARY	POST OFFICE	RESIDENT DOCTOR	MARKET	PLAZA	CHURCHES	DRY GOODS STORE	HIGH SCHOOL	NEWSPAPERS SOLD	BANK	GAS STATION	ELECTRICITY	MOVIE HOUSE	SHOE REPAIR SHOP	PARK	HOSPITAL	PIPED WATER	HOTEL	PUBLIC PHONE
CABANATUAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
GAPAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
SAN JOSE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
GUIMBA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
CUYAPO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
MUNOZ	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
ZARAGOSA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
QUEZON	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
LUPAO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	0
SAN ANTONIO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
TRALAVERA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
CABIAO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0
STO. DOMINGO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
JAEN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
STA. ROSA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
BONGABON	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
SAN ISIDRO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
PENARANDA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
RIZAL	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0
SAN LEONARDO	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0
GEN. TINIO	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0
LAUR	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
LICAB	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
TALDGTDG	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
CARRANGLAN	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0
NAMPICUAN	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
LLANERA	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
GEN. NATIVIDAD	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
PANTABANGAN	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
GABALDON	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0

FIG. 7 RESULTS OF ATTEMPTS TO SCALE FACILITIES OF 30 COMMUNITIES IN NUEVA ECIJA. SHADED CELLS INDICATE CASES WHERE DURATIONS FROM A PERFECT SCALE PATTERN WERE OBSERVED. (A 1 INDICATES THE PRESENCE OF A FACILITY AND A 0 SHOWS ITS ABSENCE).

RANDOM SAMPLE N=39	MUN. BLDG.	POLICE FORCE	MUN. SEC.	POST OFFICE	CHURCHES	DRG GOODS	MARKET	RES. OR.	PLAZA	H. S.	GAS STA.	ELEC.	NEWS	BANK	SHOE &	PIPED WATER	MOVIE	PARK	HOSPITAL	TELEPHONE	HOTEL
QUEZON CITY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PASAY CITY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CALOOCAN CITY		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CAVITE CITY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CABANATUAN CITY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TANAUAN, BAT.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
NAGCARLAN, LAG.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PAKIL, LAG.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
BALIWAG, BUL.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
MAUBAN, QUEZON	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0
SINILOAN, LAG.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0
STO. TOMAS, BAT.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0
TIAONG, QUEZON	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	1	1	0
SAN MIGUEL, BUL.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
TANAY, RIZAL	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1
PITOGO, QUEZON	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	0	1
TAGING, RIZAL	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0
ALITAGTAG, BAT.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	0	0
ROSARIO, CAVITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1
CALUMPIT, BUL.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
PATEROS, RIZAL	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
PAGBILAO, QUEZON	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
SAN JOSE DEL MONTE, BUL.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0
MUNOZ, N.E.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0
TAGKAWAYAN, QUEZON	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	0	0	0	1
STA. MARIA, LAG.	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0	1
P. GARCIA, BAT.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0
TALISAY, BAT.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	1	1	0
CAVINT, LAG.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
MAJAYJAY, LAG.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
ANGAT, BUL.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
CABIAO, N.E.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
QUEZON, QUEZON	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	0	0	0	0	0	0
RIZAL, N.E.	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0
BONGABON, N.E.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
TALUGTAG, N.E.	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0
GEN. LUNA, QUEZON	1	1	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
HANERA, N.E.	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
PANTABANGAN, N.E.	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0

FIG. 8 RESULTS OF ATTEMPTS TO SCALE FACILITIES OF 44 COMMUNITIES IN THE PROVINCE OF QUEZON. SHADED CELLS INDICATE DEVIATION FROM A PERFECT SCALE PATTERN (A 1 INDICATES THE PRESENCE OF A FACILITY AND A 0 SHOWS ITS ABSENCE.)

	MUNICIPAL BUILDING	POLICE FORCE	PAID MUN SECRETARY	POST OFFICE	MARKET	DRY FOODS STORE	GAS STATION	CHURCHES	BANK	RESIDENT DOCTOR	PLAZA	ELECTRICITY	HIGH SCHOOL	SHOE REPAIR SHOP	MOVIE HOUSE	NEWSPAPER SOLD	PIPED WATER	PARK	HOSPITAL	PUBLIC PHONE	HOTEL
MALABON	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MAKATI	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
QUEZON CITY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CALOOCAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PASAY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MANDALUYONG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
SAN JUAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TAYTAY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PASIG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PARANAQUE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ANTIPOLO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	[1]	1	1
MARIKINA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
MORONG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
TANAY	1	1	1	1	1	1	1	1	1	1	1	1	1	[1]	1	1	1	1	1	0	[0]
PATEROS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
BINANGONAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
LAS PIÑAS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	[1]	1	1	1	0	0	[0]
TAGUIG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	[1]	0	0
NAVOTAS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	[1]	0
MUNTINGLUPA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	[0]	0
ANGONO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	[0]	0	0	0
PILILLA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	[1]	0	0	0	0
BARAS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	[0]	0	0	0
CARDONA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	[0]	0	0	0	0	0
CAINTA	1	1	1	1	1	1	1	1	1	1	[1]	1	1	1	0	0	0	0	0	0	0
SAN MATEO	1	1	1	1	1	1	1	1	1	1	1	1	1	0	[0]	0	[0]	0	0	0	0
MONTALBAN	1	1	1	1	1	1	1	1	1	[1]	1	1	1	0	0	[0]	0	0	[0]	[0]	0
TERESA	1	1	1	1	1	1	1	1	1	1	1	1	0	0	[0]	0	[0]	[0]	0	0	1
JALAJALA	1	1	1	1	1	1	1	1	1	1	1	0	[0]	0	0	0	0	0	0	0	0

FIG. 9 RESULTS OF ATTEMPTS TO SCALE FACILITIES OF 29 COMMUNITIES IN THE PROVINCE OF RIZAL. SHADED CELLS SHOW DEVIATIONS FROM A PERFECT SCALE PATTERN. (A 1 INDICATES THE PRESENCE OF A FACILITY AND A 0 SHOWS ITS ABSENCE).

from application of an effective guessing strategy; i. e., guessing that the matrix had all 1's. (Assuming the guesser knew there were more 1's than 0's.) A comparison of observed reproducibility and that which could result from such a guessing strategy are provided in Table 2. In all cases, observed reproducibility comfortably exceeded the reproducibility obtained by guessing in a sophisticated way. Although the size of the increase was not as striking as before, it should be recalled that the standard of comparison was much more difficult.

Province	No. of Communities	Observed Reproducibility	Guessing Strategy Reproducibility
Batangas	30	97.5%	77.6%
Bulacan	24	97.5%	82.9%
Cavite	22	96.5%	73.4%
Laguna	30	98%	85.7%
Nueva Ecija	30	99.6%	68.7%
Quezon	44	93%	69.4%
Rizal	30	96%	87.8%

Table 2: Comparison of observed reproducibility and that which would result from application of a sophisticated guessing strategy for each of the seven separate province scales.

The next applicable set of data is shown in Table 3, where the number of errors in scaling observed in each province are contrasted with the number expected if one followed a sophisticated guessing strategy. Based upon a X^2 analysis of the total score, the number of observed deviations was substantially and significantly below the number expected from an application of the maximally effective guessing strategy ($X^2 = 699.59$, $P < .001$). However, the total number of errors made was also significantly above what would be expected from a 90% improvement over the guessing strategy ($X^2 = 53.11$, $P < .001$).

NUMBER OF DEVIATIONS FROM A PERFECT SCALE PATTERN

Provinces	Observed	Sophisticated Guessing Performance Expectations	% Improvement over Sophisticated Guessing
Batangas	16	141	88.7%
Bulacan	13	86	84.9%
Cavite	14	123	88.6%
Laguna	12	90	86.7%
Nueva Ecija	8	197	95.9%
Quezon	65	285	77.2%
Rizal	25	77	65.5%
Totals	3	999	84.7%

Table 3: A comparison of observed deviations from a perfect scale pattern with performance expected if one applied a maximally effective guessing strategy.

In summary, the reproducibility of the seven scales for individual provinces were all above the Guttman criterion of 90%. Also, in all seven cases the number of deviations from a perfect scale pattern was significantly below what could be accounted for by application of a maximally effective guessing strategy (a measure of just how far luck could be used to explain the data). Although the situation varied somewhat from province to province, it appears that in general the scales had substantial validity. From these findings one can conclude that as long as results are confined to the province level, there is an ascending series of Poblacion facilities which could reasonably be interpreted as indices of development. Therefore, insofar as the appearance of facilities goes, it appears reasonable to conclude not only that developmental progress exists, but that it occurs in a manner sufficiently predictable to permit viewing the process of facilities development as a unidimensional continuous phenomenon. This does

not necessarily mean that such an interpretation holds for all facilities (or across provinces for that matter); but for the list studied, and given the conditions in which it was studied, this conclusion is justified.

A GENERALIZED DEVELOPMENT RATING SCALE

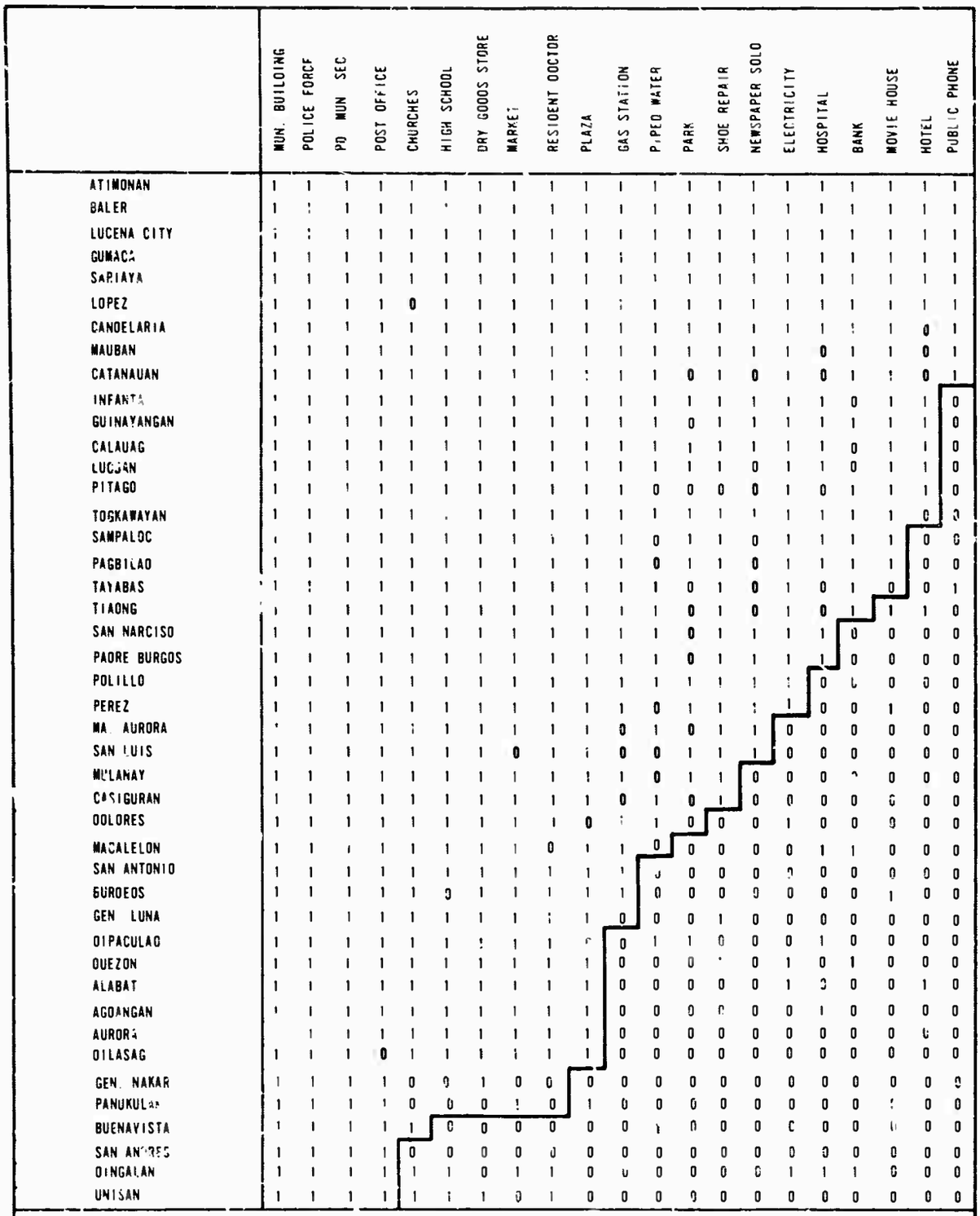
Granting that it is possible to construct undimensional development ranking scales of facilities for specific provinces, the more interesting question concerns the feasibility of constructing scales applicable to all seven Tagalog-speaking provinces. To examine this possibility, two steps were taken. First, a comparison was made of each of the seven separate province facilities scales to determine the extent of rank order agreement, i.e., the extent to which the ranking of the twenty-one facilities remained consistent over the seven provinces.

Kendall's W. (Siegel 1956) was used for this purpose. It results in production of a coefficient ranging from zero, which shows no agreement, to 1 which indicates perfect agreement. Table 4 shows the basic data used in the calculation. The community facilities list at the top of Table 4 is the one which resulted from application of the averaging process described earlier in the paper. In other words, it represents an attempt to produce a generalized facility development scale. The rank order of each of these facilities in the seven separate province scales is then provided. The resulting W was equal to .9003, a figure showing substantial agreement across provinces. By using a conversion technique explained by Siegel (1956), this means that the average Spearman rank order correlation between provinces was +.933. In short, the individual province scales correlated highly.

A second test of the generalized developmental facilities rating scale was conducted by taking a random sample of 39 of the 209 communities studied without regard to their home province. Results are shows graphically in Figure 10. Note that the pattern of errors appears to be random. The amount of reproducibility present in the general scale was 96 percent, a figure well above the 90 percent Guttman criterion. Further, when the number of derivations from perfect scaling (33) was compared to the best that could be done by following a maximally effective guessing strategy (160), it was found that they were rougly one-fifth of

PROVINCES	COMMUNITY FACILITIES LIST																				
	MUNICIPAL BLDG.	FOLICE FORCE	MUNICIPAL SEC.	POST OFFICE	CHURCHES	DRY GOODS STORE	MARKET	RESIDENT M.D	PLAZA	HIGH SCHOOL	GAS STATION	ELECTRICITY	NEWSPAPERS	BANK	SHOE REPAIR SHIP	PIPED WATER	MOVIE THEATER	PARK	HOSPITAL	TELEPHONES	HOTEL
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
BATANGAS	1	2	3	4	7	8	11	5	9	6	13	15	17	12	17	14	19	21	16	18	20
BULACAN	1	2	3	4	8	6	9	5	12	16	7	10	11	14	13	17	18	15	19	20	21
CAVITE	1	2	3	4	6	9	8	12	5	11	13	7	10	14	16	18	19	15	20	17	21
LAGUNA	1	2	3	4	7	11	5	10	6	13	12	9	16	14	15	8	19	18	20	17	21
NUEVA ECIJA	1	2	3	4	8	9	6	5	7	10	13	14	11	12	16	19	15	17	18	21	20
QUEZON	1	2	3	4	5	7	8	9	10	6	11	16	15	19	14	12	18	13	17	21	20
RIZAL	1	2	3	4	8	6	5	10	11	13	7	12	16	9	14	1	15	18	19	20	21

TABLE 4 RANK ORDER COMPARISON OF EACH OF THE FACILITIES INCLUDED ON THE GENERAL SCALE WITH THE SCALES DESIGNED FOR EACH SPECIFIC PROVINCE



	MUN. BUILDING	POLICE FORCE	PO MUN SEC	POST OFFICE	CHURCHES	HIGH SCHOOL	DRY GOODS STORE	MARKET	RESIDENT DOCTOR	PLAZA	GAS STATION	PIPED WATER	PARK	SHOE REPAIR	NEWSPAPER SOLD	ELECTRICITY	HOSPITAL	BANK	MOVIE HOUSE	HOTEL	PUBLIC PHONE
ATIMONAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
BALER	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
LUCENA CITY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
GUMACA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
SARIAYA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
LOPEZ	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CANDELARIA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
MAUBAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1
CATANAUAN	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	0	1	1	0	1
INFANTA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0
GUINAYANGAN	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0
CALAUAG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0
LUCBAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	0
PITAGO	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	1	1	1	0
TOGKAWAYAN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
SAMPALOC	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	0	0
PAGBILAO	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	0	0
TAYABAS	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	0	1	0	0	1
TIAONG	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	0	1	1	1	0
SAN NARCISO	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0
PADRE BURGOS	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0
POLILLO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
PEREZ	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	1	0	0
MA. AURORA	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	0	0	0	0	0	0
SAN LUIS	1	1	1	1	1	1	1	0	1	1	0	0	1	1	1	0	0	0	0	0	0
MILANAY	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0
CASIGURAN	1	1	1	1	1	1	1	1	1	1	0	1	0	1	0	0	0	0	0	0	0
DOLORES	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	1	0	0	0	0	0
MACALELON	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	1	1	0	0	0
SAN ANTONIO	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
BURDEOS	1	1	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0
GEN. LUNA	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0
DIPACULAO	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	1	0	0	0	0
QUEZON	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	1	0	1	0	0	0
ALABAT	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0	0	1	0	0
AGOANGAN	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0
AURORA	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
DILASAG	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
GEN. NAKAR	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PANUKULAN	1	1	1	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0
BUENAVISTA	1	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
SAN ANDRES	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DINGALAN	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	1	1	1	0	0	0
UNISAN	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0

FIG. 10 RESULTS OF AN APPLICATION OF THE GENERAL DEVELOPMENT SCALE FOR ALL PROVINCES TO A RANDOM SAMPLE OF 39 COMMUNITIES. SHADED CELLS SHOW DEVIATIONS FROM A PERFECT SCALE PATTERN. (A 1 INDICATES PRESENCE OF A FACILITY AND A 0 ITS ABSENCE.)

that number. Therefore, insofar as it was tested in this study, there appears to be little doubt that a generalized scale of development is feasible at least for Poblacions in the Tagalog speaking region of the Philippines.

It is also interesting to note that this scale agreed reasonably well with the one constructed by Fujimoto. There were only three out of twenty-one facilities which did not show a close correspondence on the two scales: churches, which were item 5 on this scale and item 12 on Fujimoto's; banks, which were item 14 on this scale and 19 on Fujimoto's; and hotels, which were item 21 on this scale and 14 on Fujimoto's. In seven cases items occupied exactly the same rank order position on the two scales (the presence of): a police force, paid municipal secretary, high school, shoe repair shops, piped water, movie theater, and park. In four cases the rank order of facilities was only one rank apart (for presence of a market, electricity, a hospital, and a public telephone). In four more cases the rank orders of facilities were two units apart (dry goods store, plaza, gas station, and newspapers for sale). In three cases the scale separation was three ranks (municipal building, post office and resident M.D.). Therefore, it appears that construction of a facilities check list to assess community development in all Philippine Poblacions is very possible -- especially, if one is willing to compress the scale to a point where it has approximately ten to twelve levels instead of the twenty-one used here. (See Edwards, 1957, for ways to do this, one of which is called the H technique.)

REFERENCES

Dobyns, H. F., Doughty, P. L., and Holmberg, A. T., (1966) Measurement of Peace Corps Program Impact in the Peruvian Andes. Cornell University: Dept. of Anthropology

Edwards, A. L., (1957) Techniques of Altitude Scale Construction. New York: Appleton Century-Crafts, Inc.

Fujimoto, I., (1965) The Process of Community Differentiation: An Insight into Development. Philippine Sociol. Rev. 13-4 (Oct.) 199-210.

Green, B. F., (1954) Attitude Measurement, in Lindzey, G(Ed) Handbook of Social Psychology, Vol. I, Cambridge, Mass.: Addison -- Wesley, pp. 335-369

Guttman, L., (1950) Relation of Scalogrem Analysis to Other Techniques, in S. Stouffer (Ed) Measurement and Prediction, Princeton, N.J.: Princeton U. Press 172-212.

Kunkel, J. H., (1961) Economic Autonomy and Social Change in Mexican Villages. Econ. Develop. and Cultural Change; 10:1 (Oct.) 51-63.

Siegel, S., (1956) Nonparametric Statistics for the Behavioral Sciences. New York: McGraw-- Hill.

Thurstone, L. L., (1947) Multiple Factor Analysis. U. of Chicago Press.

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13. ABSTRACT

This paper presents an empirical demonstration of the degree to which it is possible to use a simple rating of which twenty-one facilities are present in a community as an index of that community's level of development. Two hundred nine poblacions in the seven Tagalog speaking provinces of Luzon were studied. A generalized Guttman type scale was devised which was found to have 96% reproducibility. Further, the scale correlated highly with one used elsewhere in the Philippines. Sample items include presence of a hotel, public telephone, shoe repair shop, plaza, high school, and gas station. Relationship to other types of scales is discussed.

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