Dimensions of Stimulus Situations
Which Account for Behavior Variance
Contract Nonr -3436(00)
Group Psychology Branch
Office of Naval Research

Technical Report No. 2
June, 1962

TOWARD A TAXONOMY OF ORGANIZATIONS

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For Presentation At
CONFERENCE ON ORGANIZATION RESEARCH
Graduate School of Industrial Administration
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Pittsburgh, Pennsylvania

22 June 1962

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THE TAXONOMIC APPROACH

Taxonomy has long been a special occupation of biologists, who have classified plants and animals according to their observed relationships and formulated principles underlying these classifications. The importance of the principles of taxonomic systems must be emphasized because classifications have little value in themselves, except as fascinating diversions for the idle and indigent. On the contrary, taxonomic models have served as a basic strategy for explanation and prediction of the behavior of organisms. Taxonomic characteristics are explanatory to the extent that they serve as indices to behavior traits (Cowles, 1905).

A useful taxonomy should be a theoretical model which orders empirical observations and also permits predictions guiding new observations, based on the developed network of relationships. In its fullest development the taxonomic approach should conform to the general systems approach; in any case the two are compatible and perhaps the salient strengths of each may contribute to the goals of the other. For example, the concern of the

taxonomist with accounting systematically for extensive detail may enhance the systematist's analysis of complex systems, while the early appreciation of the characteristics of systems may orient the taxonomist to strategically significant interactions.

The multidimensional model for an organizational taxonomy presented here is based on the following assumptions:

1. Organizations are behaving organisms whose behavior is represented by the coordinated, composite action of their members functioning in their roles as organizational members.

2. The behavior of organizations with respect to any task or index is a predictable function of three major sources of variance, discussed below, which may be referred to as (1) characteristics of individuals participating (abilities, motivational and stylistic personality traits, background, past experience and training, ethnic factors, etc.), (2) organizational characteristics (goals, tasks, group structure, facilities, procedures, etc.), and (3) characteristics of the physical and social environment. It is assumed that significant portions of the variance of behavioral criteria will be accounted for by factors representing these separate sources as well as by other factors representing interactions of these sources.

3. The universes of variables representing persons, organizations, and external environment can be represented by factored dimensions (or common factors) which order the myriad of specific observable characteristics in terms of generalized composites that are both more stable and less redundant, for multivariate prediction, than the specifics by which they are defined.

4. The total variance of any criteria of organizational behavior can be accounted for by weighted combinations of the universe of dimensions of persons, organizations, and environment, within the limits of measurement error. Multiple regression

equations, discriminant functions, or other appropriate multivariate techniques are applicable to the prediction problem, but the development of predictor factors for each of the major sources of organizational behavior, and of suitable criteria, are issues of prior importance.

5. The dimensions of the taxonomy of organizations will be indicated by the differential patterns of predictive weights obtained for various combinations of factors.

The research necessary to formulate even a tentative taxonomy of organizations in the present frame of reference has not yet been done, although the state of the scientific knowledge and measurement technology in the three major areas of concern is encouraging. These are commented upon in the appropriate sections, below. It seems feasible to define the universes of variables with some expectation of agreement. However, progress toward dimensionalization has been meagre. This has been greatest in the area of individual differences; some impressive pioneering work (Hemphill, 1956) has been published on dimensions of groups; dimensions of the physical and social environment appear to have received least attention. Finally, the criterion problem stands as a solid barrier that has defied solution almost from the beginning of behavioral science.

The program outlined here may appear impractical and in fact it may be impractical at this time, although I am not convinced

of this. Developments in computer technology are moving so rapidly that new machines are obsolescent even before they appear on the market. However, it is hoped that the issues raised here will be judged on their scientific merit rather than on the basis of cost, equipment, or even time required. This problem offers great challenge. The question is, what steps are necessary to meet it?

THE UNIVERSES OF VARIABLES RELATED TO ORGANIZATIONAL BEHAVIOR

Characteristics of Individuals Participating

In management terms, this category involves the functions of organizational staffing, that is, of obtaining qualified personnel for particular tasks and roles, including inter-role coordination, when required. Personnel staffing is concerned primarily with fitting individuals to jobs, but the assumption is implicit that there is a relationship between characteristics of individuals and performance of groups composed of combinations of individuals. This relationship is, of course, not independent of other factors associated with group performance, such as organizational planning and management related to job definitions and procedures, compensation, working conditions, career plans, union-management relations, and numerous other internal and external factors.

In the context of the present problem, there are three questions of interest concerning the measurement of individual differences among persons in the study of organizational behavior. These involve (1) the extent of information available on the relation of individual qualifications to performance of various jobs or roles; (2) the relation of qualifications and/or performance of individuals to group or team performance; and (3) the state of

knowledge concerning ability and personality organization and measurement technology regarding individual differences.

There is an extensive literature, in the field of personnel selection, on the correlation of various measures of individual differences with performance criteria of particular jobs. For the most part, however, the results reported are based on unsystematic, questionable instruments, confined to individual companies or organizations, or both, and the relevant conditions of organization and environmental setting have not been stated, thus limiting generalization. The latter difficulty might be reduced by randomization of uncontrolled factors through the use of large samples, but very few truly large-scale selection studies have been reported. The outstanding example is the U.S. Army Air Forces Aircrew Selection Program in World War II, (Flanagan, 1947, Sells, 1961c) which employed large enough samples, over a sufficient period of time and a large enough number of employing organizations, so that the effects of internal and external factors were well randomized. As a result, the basic prediction formulas were successfully generalized to aircrew selection programs of other countries (France, Norway, West Germany), to post-war changes in aircraft equipment, when jets replaced piston-propeller types of aircraft, and to civilian airline selection.

Information of this type is of great value for the present problem. However, there are only a few studies of this quality, mostly military, and even in these studies, the relations of individual to group proficiency are not clearly understood.

Aptitude, interest, and personality measures, used in personnel selection, have been of two types: special-purpose tests and scales, tailored to particular situations, and more general measures of primary traits in the ability and personality spheres, derived from factor analytic studies of responses to broad batteries of relevant variables. At best, the special-purpose selection devices have been difficult to interpret. Some have had utility in the limited circumstances for which they were designed, but have frequently lost validity when conditions changed. Development of composite validities for such measures from the published literature, by data retrieval procedures, has generally been unproductive, for obvious reasons.

Theoretically, appropriately developed measures of common factors of ability and personality, which represent common sources behavior variance, should fare better. Measurement, in such terms, is systematic and meaningful. It is comprehensively related to the entire spectrum of individual differences, rather than to those particular behaviors assumed to be relevant

to particular job samples. Then, when either job elements or job conditions change, it becomes necessary only to compute new regression equations based on the same predictors, but not to develop new predictors. Data retrieval of regression weights, based on a common taxonomy of human traits, is also a more reasonable prospect.

Relationships between personal characteristics and performances of individuals and their composite performances when working together as teams have been studied in the field and in the laboratory. Haythorn (1957) reviewed the research on group assembly, with particular reference to aircrew composition. He concluded that variations in crew effectiveness can be accounted for by variations in the particular combinations of individuals composing the groups, but also that self-selection methods of crew assembly were more successful than any rational methods that had been tried. Agreement on values relevant to group performance has been one of the most important determiners of compatibility among crew members and appears to be related to crew proficiency (Sells, 1961b).

Laboratory studies have not generally involved the interaction over time and standardization of roles characteristic of operational aircraft crews, but have achieved more accurate

control of task and individual difference variables. In a number of such studies reviewed recently by Wiest, Porter, and Ghiselli (1961), team proficiency depended on a variety of factors, including size of group, similarity of group members, type of task, and amount and type of interaction between members in performance of the task, as well as on the distribution of proficiencies among group members. Such research has usually concentrated on the relation of measures of individual members to criteria of composite performance and noted only incidentally, if at all, the complex issues of group structure, norms, intergroup relations, and environmental factors. By the same token, group workers appear to be equally prone to overlook individual differences, although there is little doubt that these account for significant variance in group performance.

At this time, satisfactory measures of primary mental abilities (Verbal Comprehension, Numerical Facility, Reasoning, Spatial Visualization, Memory, Word Fluency, Perceptual Closure), perceptual abilities, sensory acuities, motor skills, and of a number of aptitude clusters, are available. However, leading authorities, such as Thurstone (1945) and Guilford (1959) have expressed the belief that the range of significant primary human

abilities includes additional areas to those thus far subjected to systematic study. In contrast to ability measurement, however, the classification and technology for measurement of motivational and personality traits is rudimentary. There is as yet no generally accepted taxonomy of motivational and stylistic personality traits, although developments in this field are progressing rapidly (Cattell, 1957, Guilford, 1959, Sells, 1962a). The best measures in this field today have limited validity for general use and require revalidation in specific situations. These limitations will be reflected in the schedule of measures of individual difference variables, below.

A detailed enumeration of the variables comprising the individual differences category is presented by Guilford (1959). Our purpose here is to outline the principal classes of such variables, from which further elaboration may be undertaken. These are:

1. Abilities (aptitudes and acquired skills)
2. Motivational traits
3. Stylistic personality traits
4. Biologic and constitutional factors

   age, sex, height, weight, coloring, somatotype, appearance, ethnic origins, physical handicaps, genetic factors

5. Social and demographic factors

education, social class, economic status, geographic-culture exposures, family background, siblings, family relations, marital status, citizenship, legal status (military service, voting, parole, etc.), occupational experience and status, responsibilities and dependencies, possessions, religious background and practice, linguistic background, group memberships, reference groups, roles.

6. Motivations related to participation in the situation

relations of individuals' goals to those of the organization, identification with the organization, identification with other organizations and groups, identification with role in organization, problem or task, with other participants, attitudes re locale, situation, and conditions of participation

7. Relationships among participants

previous interactions among participants, role relationships in organization and their stability, dependencies among participants, social and cultural normative characteristics of participants (distribution)

This outline reflects the present imperfect state of the psychology of individual differences. At least 500 discrete variables would be required to represent all of the information implied, but it is reasonable to expect that a considerably lower number will be found after further research on new abilities and personality traits, not yet isolated and on reduction of the full range of variables is completed. At present, a list of 35 to 45

variables representing factors most reliably measured and accounting for major segments of factor matrix variance could be realistically assembled. This might include a list such as the following:

Primary mental abilities (6 variables)

Motivational traits (10)

Stylistic traits (10)

Proficiency measures (3)

Age

Sex

Education

Socioeconomic status

Ethnic status

Reference group indices (5)

Attitudes toward participation in organization (5)

Organizational characteristics

Despite the extensive activity in group behavior and management research, it is probably conservative to generalize that the state of rigorously demonstrated knowledge of organizational characteristics and behavior at this time approximates more closely that of personality measurement than ability measurement, commented on in the preceding section. A number

of investigators, such as Cattell (1951, 1962), Comrey, Pfiffner and High (1954), Hemphill (1956), March and Simon (1959), Sherif and Sherif (1956), Stogdill (1959), as well as others, have made significant theoretical and empirical contributions clarifying methodological problems and exploring major segments of the relevant universe of variables. But few would question that methodological difficulties have plagued this field and that what has been done, however fine, is scarcely more than a beginning.

The difficulties inherent in both field and laboratory methods of organizational research are unquestionably frustrating and have given this field a "high risk" rating. We need not dwell on the familiar problems of criteria, control, data collection without disturbing on-going interactions, and the countless other barriers to effective field research, which have been surveyed recently by Adams and Preiss and their associates (1960). The issues are well known and will probably persist until more responsible management support, better financing and closer integration of research with operations permit more effective planning and execution.

These problems have led many investigators to simpler approaches, in the laboratory and through simulation. Although

my own professional training and affiliations are experimental, I feel constrained to make a few methodological comments on the latter approaches. We have already mentioned the interdependence of individual difference and environmental variables with those reflecting organizational characteristics, and emphasized, in the discussion of individual difference variables, the importance of randomization of uncontrolled variance, preferably by very large samples, when significant sources of variance remain uncontrolled. Many small group studies not only violate these principles, but also, in the process, utilize conditions of interaction that could scarcely be called "group" and tasks that are unrealistic, even though often easier to control. An important condition of group formation is the awareness among several individuals of common motives shared, but incapable of separate attainment, which are conducive to interaction (Sherif and Sherif, 1956).

An important aspect of group structure is the achievement of stable reciprocal expectations among members, as a result of cooperative interaction over a period of time. Group structure develops, as a reciprocal learning process, from incipient, togetherness situations to highly stable organizations which

reflect group norms, status, power, and specialized roles that exert significant effects on behavior of the participants. Laboratory groups, which consist of individuals given assigned roles on an ad hoc basis, without a developed structure, and which often perform tasks unrelated to their joint performance, often seem, to me at least, to lack the very characteristics of groupness that are critical to the research they are intended to implement.

Simulation techniques have attempted to provide more realism, and some, such as studies by Bass (1962) and by Haythorn (1957, 1958), have succeeded quite well in many respects. Critical appraisal of such studies will undoubtedly lead to further improvement, particularly with regard to issues of group stability, exploitation of more realistic common motives, and replication. The possibility of using full-time, paid participants in life-size, long term simulations is a most engaging prospect.

The following, compressed list of variables does not fall into categories as neatly as those of the preceding section and is less specific. This probably reflects differences in methodology between psychometrics and group studies and perhaps also the limitations of the writer. It seems doubtful that organizations are more complex than the people who participate in

them. However this may be, the following list of variables reflects types of information concerning organizations that have been found relevant to their behavior and that of their members. No claim of completeness can be made, but a wide range of organizational characteristics is outlined.

1. Characteristics of group task or problem, situation and setting

Factors defined by the primary task (for each separate task group)

area and level of knowledge and skills required

hazards and risks involved

novelty of situation to participants

procedures permitted

information required and available

number of participants, required, permitted or available

material and facilities

degree of personal contact involved

role expectations regarding participants

2. Group structure

stability of reciprocal expectations achieved by group; time in operation; reorganization, turnover

Formal structure: intra-group patterns

Group goals: definiteness, clarity, relation to basic objectives, relations to personnel capabilities and facilities, unusual aspects

Membership patterns: requirements of experience, training, special qualifications, restrictive requirements (age, sex, race, religion, etc.), permeability of entrance and exit conditions, voluntary nature, time committments

Control of group members: freedom of movement, goals, expression, dress, schedules; regulations re conduct, work, living arrangements; rituals, ceremonies, SOP's; regulation of group procedures; work controls; regulation of participation in activities; communication channels and practices

Stratification, status hierarchy, power structure

Modus operandi, including methods of communication, supervisory methods, procedures, decision-making, training

Responsibility structure: organization and relationships of roles; departmentalization, division of labor among subgroups; role responsibilities (for what, to whom), power, privilege, prestige; requirements re individual qualifications; space and facility requirements; status mobility provisions;

Rewards, compensation, welfare, provision for individual and group satisfaction, incentives, recreation, benefits

Formal structure: inter-group patterns

Autonomy of organization and sub-groups

Pattern of centralization - decentralization

Social status of organization and sub-groups ("league standing")

Patterns of dependency, cooperation, competition in relation to other organizations

Requirements concerning communication and transactions with other organizations

Operating patterns, including conformity to formal patterns

Goals

Membership patterns

Control

Stratification, status hierarchy, power structure

Modus operandi

Responsibility structure

Rewards, compensation, welfare, etc.

Intergroup patterns

Superior-subordinate behavior patterns

The strategy of the present approach is to reduce the specific variables, enumerated in relation to the universe suggested by the above outline, to a finite system of organizational factors comparable to those discussed under individual differences. A model for such a system is the set of organizational dimensions proposed by Hemphill, which is summarized below to illustrate the nature

of the factors expected, although a more comprehensive set of factors should result from the systematic exploitation of this approach.

Using a questionnaire inquiry consisting of 150 items, Hemphill has developed measurement scales for the following 13 dimensions:

1. Autonomy: degree to which group functions independently of other groups and occupies an independent position in society. (Reflected by degree of self-determination of activities, absence of allegiance, deference, and/or dependence on other groups; 13 items)

2. Control: degree of regulation of individuals while functioning as group members. (Reflected by modifications imposed on complete freedom of individual behavior and by intensity of group government; 12 items)

3. Flexibility: degree of informality of group procedures, in contrast to adherence to established procedures. (Reflected by freedom of duties from formal specifications; 13 items)

4. Hedonic tone: degree to which membership is accompanied by pleasant affect. (Reflected by frequency of laughter, conviviality, pleasant anticipation, etc.; 5 items)

5. Homogeneity: degree to which members are similar with respect to socially relevant characteristics. (Reflected by relative uniformity of age, sex, race, socio-economic status, interest, attitudes, habits, etc.; 15 items)

6. Intimacy: degree to which members are mutually acquainted and familiar with personal details of one another's lives. (Reflected by nature of topics discussed, modes of greeting, forms of address, and by interactions which presuppose a knowledge of the probable reactions of others

under varying circumstances, as well as knowledge of members about each other; 13 items)

7. Participation: degree to which members apply time and effort to group activities. (Reflected by number and kinds of duties performed, voluntary assumption of non-assigned duties, and amount of time spent in group activities; 10 items)

8. Permeability: degree to which group permits ready access to membership. (Reflected by absence of entrance requirements and by degree to which membership is solicited; 13 items)

9. Polarization: degree to which group is oriented and works toward a single goal which is clear and specific to all members (12 items)

10. Potency: degree to which group has primary significance to members. (Reflected by kinds of needs satisfied or potentially satisfied, by extent of individual readjustment implied should group fail, relation of group participation to central values of members; 15 items)

11. Stability: degree of persistence over time with essentially unchanged characteristics. (Reflected by membership turnover rate, frequency of reorganization, constancy of group size; 5 items)

12. Stratification: degree to which membership is ordered into status hierarchies. (Reflected by differential distribution of power, privileges, obligations, and duties, and by asymmetrical patterns of differential behavior among members; 12 items)

13. Viscidity: degree to which members function as a unit. (Reflected by absence of dissension and personal conflict, self-aggrandizing behavior, resistance to disrupting forces, and by belief of members that they do function as a unit; 12 items)

The interrelations of these 13 factors (plus size of group) are most readily shown by a rotated factor matrix published by

Hemphill (1956), in which a major portion of the variance of the intercorrelations is accounted for by three group factors, which he named:

I. Behavior regulation appearing as social structure (with highest loadings on autonomy, low control, low stratification, permeability, low potency, and flexibility), which Hemphill characterized as "problem-induced" mobilization of behavior of individual members of the group:

II. Effective synergy (with highest loadings on polarization, viscidity, participation, and stability), which related to a similar factor reported by Cattell (1948) as referring to the total energy of group members, absorbed by group activity; and

III. Primary personal interaction (with highest loadings on intimacy, size, homogeneity, stability, flexibility, hedonic tone, and low control), which is related to the concept of "primary" vs "secondary" groups.

The rotated factor matrix for these three factors is as follows:

Rotated Factor Loadings (Hemphill, 1956)

Dimension	I	II	III	h^2
1. Autonomy	.78	.14	.11	.64
2. Control (low)	.69	-.14	.35	.61
3. Flexibility	.44	-.12	.37	.34
4. Hedonic tone	.15	.17	.37	.19
5. Homogeneity	.06	.00	.59	.36
6. Intimacy	.13	.01	.84	.72
7. Participation	-.29	.69	-.07	.57
8. Permeability	.62	-.07	-.18	.42
9. Polarization	-.08	.76	-.02	.59
10. Potency (low)	.60	-.23	-.16	.43
11. Size (small)	.01	.17	.74	.57
12. Stability	.02	.40	.41	.33
13. Stratification (low)	.64	.22	.15	.48
14. Viscidity	.17	.72	.23	.60

In my opinion, this work of Hemphill's is a major contribution to organizational research. Yet it has been largely ignored in the six years since the monograph appeared. One possible reason for this is that the variables and factors have been somewhat disappointing as predictors of behavioral criteria. Whether this reflects defects in the scales or in the criteria employed, or other problems, remains to be settled. More particularly, however, the predictions of these and more extensive factors descriptive of organizations, developed along the lines pioneered by Hemphill, need to be investigated in combination with the other categories comprising the complete universe of organizational behavior.

Environmental factors

Of the three of universes of variables, the preceding two have received most emphasis in relation to organizational behavior. This category includes the entire range of ecologic dependencies and relations among organizations. Although a related area involving studies of techniques and modes of organizational interaction appears to be an important area of organizational research, the effects of environmental factors on organizational behavior, while generally recognized as having significant effects on behavioral criteria, both directly and in interaction with other variables, have been largely neglected.

Ecologic dependencies include adaptations of organizations to conditions of both the physical and social environment. Recent emphasis on human ecology by behavioral scientists has focused attention on social dependencies, but the realities of adjustment of populations to the resources and physical conditions of the habitat have obvious implications for organizational behavior, which have received renewed prominence in view of current space explorations. The social aspects of human ecology have been represented by Hawley (1944) as "an organization of interdependencies which constitute the population as a functional unity." Hawley regarded this as "an outcome of the adaptive strivings of aggregated individuals." The human community is thus viewed not only as dependent on the physical conditions specific to place and time, but also as itself an adaptive mechanism in which the forms of communal structure in varying environmental contexts involve symbiotic relationships that influence behavior in many subtle and indirect, as well as obvious ways.

The ecologic approach to human behavior has certain limitations similar to those of the homeostatic concept as a basis for a psychological theory of motivation. Homeostatic functions are indeed observable in physiologic needs and tension reduction,

but applied naively, this concept does not account for all motivated behavior. For example, the "wisdom of the body" appears to be vagrant in the behavior of people who overeat, overwork, and who frequently "bite their nose to spite their face." However, recent neurophysiologic theorizing (Pribram, 1960) retains the basic equilibrative process in a more complex system that provides for variation and tuning of homeostats under central control. This new conception retains the principle of interaction of the organism and its environment, but also accounts for variation of adaptive patterns.

Similarly, at the level of populations, man has adapted in many ways to his environment, but he has also defied it in his frequently successful efforts to control and change it. He has learned how to purify sea water, to defy gravity, to inhabit uninhabitable places, and is now well on his way toward colonizing strange, new extraterrestrial environments. These accomplishments, reflecting distinctively human intellectual capacities, have given man greater range and mobility, but have not, however, freed him from symbiotic dependencies on the physical and social environment. In many cases, they have created new problems, taxing his adjustive capacities. He may develop new sources

of water, food, oxygen, and other needed supplies, but he still depends on these supplies. He may be able to generate thrusts to neutralize gravity, but cannot remain aloft otherwise. Conditioned living areas must be maintained within biological limits and their utility for human activities depends on conditions of communication, mobility, and social support. These complex ecologic dependencies are well illustrated by the extensive changes observable in the behaviors of virtually identical air defense surveillance squadrons located in the environs of a large U.S. city, such as Fort Worth, in comparison with those stationed at remote Alaskan sites. The methods of human ecology are primarily concerned with adaptive behavior of populations and are not suited to the study of ecologic problems of particular formal groups within populations. These important issues are better suited to the approaches of anthropology, sociology, psychology, and the other behavioral science disciplines concerned with interactions of members of organizations and of actions reflecting the collective products of organizations.

The variables in this category represent ecologic interactions with both the physical and social environment, by organizational members, their families, and associates, as well as by organizations. Extensive recognition of a wide range of social dependencies

exists, even though not adequately reflected in research on organizational behavior. Comparable concern with physical aspects of the environment is unusual in organizational research, but can be defended on both theoretical and practical grounds if it is granted that these aspects, too, account for significant criterion variance. The following outline includes both aspects of the environment. Although an attempt has been made to be comprehensive, it is likely that some conspicuous hiatuses may be found.

1. Physical aspects of the environment

   Gravity

   Radiations and radioactive fallout

   Climate and weather: temperature, humidity, atmospheric pressure, oxygen tension, atmospheric changes (winds, storms), rainfall, snow, ice and related phenomena

   Terrain: rivers, lakes, mountains, valleys, deserts, forests, swamps, coastal plains; elevation, erosion; earthquakes, etc.

   Natural resources: sources of food (fish, game, vegetation, crops), shelter, clothing; minerals; timber; water

   Culture products: facilities and technology related to transportation, power, communication, construction, manufacturing, distribution, agriculture, housing, habitability, warfare; characteristics and location

of centers of population industry, government, education, research, entertainment, recreation, arts.

2. Social aspects of the environment

Non-material culture: ascriptive solidarities (family, kinship, relationship systems; ethnic solidarities; primary groups; territorial community); occupation and economy (economic institutions, organization of the economy, units of the economy, economic trends); stratification and mobility of the population (class, occupation, social stratification); political organization and authority (political power, political organizations); religion and society; linguistic patterns; education; law; the arts, recreation, and entertainment; technology; science, value systems, beliefs, symbolic systems; health and welfare.

Social and economic states; level of the economy, health, education, crime, morality, morale, intergroup tensions, cold war, strikes, disasters, etc.

Factors defined by locales and geographic setting of the organization: physical and social factors peculiar to locales, remoteness, physical restraints (communication, travel, mobility), parameters of non-material culture, social and economic states applicable to sites and locales of operation.

Relations with other organizations: hierarchical relations with parent and subordinate organizations, sources of support, competitive organizations, sources of threat and conflict; relations with unions, clients, regulatory agencies, trade associations, community groups, eleemosynary agencies, etc.

A very modest attempt to formulate a research program designed to dimensionalize this universe has been undertaken by the writer and is described in a recent report of a symposium

on Dimensions of Stimulus Situations Which Account for Behavior Variance (Sells, 1962 b,c) which was held at Texas Christian University in April, 1961. The magnitude of this problem appeared discouraging to a number of the participants, but it appears that appropriate designs for both data collection and analysis are feasible, provided that the work can be undertaken on a large enough scale to reflect variations in significant dimensions that do not appear within the confines of a limited environmental situation. The present phase of the project is concerned with problems of design and some preliminary pilot studies. Some related research appears in the report of the Tri-Service Conference on Research Relevant to Behavior Problems of Small Military Groups Under Isolation and Stress (Sells, 1961a), held at Texas Christian University also, in March, 1961.

MEASUREMENT OF ORGANIZATIONAL BEHAVIOR: THE CRITERION PROBLEM

By approaching the problem of organizational behavior in the frame of reference of a complete universe of relevant dimensions, the criterion problem is greatly simplified. Measures and indices of behavior that are inappropriate for univariate predictions, because of differential effects of uncontrolled factors, are eligible in what we may call, by contrast, the omnivariate approach, simply because this approach takes all relevant factors into acccunt. It is therefore unnecessary to resort to indirect, substitute measures, such as frequently questionable rating procedures, and more effective use can be made of objective indices of sales, production, and comparable information. The problem is not one of controlling disturbing factors, but only of distributing the variance among the predictors.

The determination of appropriate criteria for the aspects of group behavior relevant to the taxonomic study is an important feature of the research strategy. In view of the omnivariate approach this may be guided by the research objectives, without undue concern about disturbance by issues of practical feasibility. Any reliable index of group behavior is an eligible criterion measure, although factored composites of available performance

indices have advantages of stability and generality. Multiple criteria, reflecting the range of meaningful behaviors of organizations in relation to their appropriate functions are not only feasible, but essential to provide insights concerning the relative weights of various factors to significant aspects of organizational activity.

Initially it would seem most profitable to focus attention on criteria related to organizational missions or objectives. The rationale for this position is related to the basic philosophy of organizational research, which is concerned with maximizing effectiveness of goal attainment. The mission is the raison d'etre of an organization and if the mission fails, morale, welfare, and other desirable sub-goals of its efforts are of little worth.

It is believed that satisfactory mission-related criterion measures are available for many kinds of organizations, particularly task-oriented organizations in industry and in the military services. A distinction must be made, in this connection, between what have been referred to as "can do" and "do do" criterion indices. The former refer to training, maintenance, proficiency up-grading, and the like, which serve the purpose of improving the posture of an organization with reference to mission performance, but do not actually reflect performance. In the

present frame of reference such measures would be included among the dimensions of intra-organization description and would not be considered criteria. Similarly, proficiency tests on simulation tasks are not measures of actual performance, but belong properly in the "can do" category. The criteria must reflect the actual performance of the organization, with respect to desired aspects, over the entire period of time that such performance is subject to study.

PATTERNS OF INTERACTION RELATED TO PERFORMANCE CRITERIA: BASIS FOR A TAXONOMY OF ORGANIZATIONS

The programs of research outlined in the preceding sections are monumental. It is doubtful that they will ever be considered completed, but this is the nature of scientific progress. However, it is necessary to have some reasonably satisfactory inventory of factors to represent each of the three universes discussed above, and measurement instruments for them, in order to undertake the taxonomic study. As indicated earlier, a reasonable battery of 35 to 45 dimensions of individual differences is available now. Dimensions of organizations and of environmental factors remain to be developed, although the organizational dimensions of Hemphill represent an important contribution in that area. For purposes of discussion it is assumed that a battery of 100 dimensional variables will represent the three universes, of persons, organizations, and environment.

A preliminary study relating these variables to organizational criteria might be undertaken on a diverse sample of 250 organizations. Organizations, for this purpose, should be arbitrarily limited to organized, but not necessarily formal groups of not over 150 persons; with reasonably specific overall goals (as distinguished

from multi-phase corporate operations), for which suitable criterion measures are available. The cooperation of their managements would, of course, be essential in order to complete the immense amount of individual measurement, observation, recording, and associated data collection. A period of observation of one year, common to all of the groups, would be ideal, but this would require a massive staff. As an alternative, data might be collected over a five-year period, taking 50 groups per year, still a gigantic undertaking, but closer to the limits of reality.

The analysis can be discussed in terms of a matrix of 100 independent and perhaps 10 dependent variables, for about 25,000 persons and 250 organizations scattered widely geographically. Electronic data processing equipment at a central location would handle scoring and computation. Standard multivariate methods would be used for multiple factor analyses of the intercorrelation matrices, including the criterion measures and discriminants predicting each of the criteria as well as combinations of criteria (Sells, 1955). The results would indicate various patterns of variables related to patterns of organizational behavior. At this point the basis for taxonomy of organizations would be in view.

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