(Working Paper Series - 97)
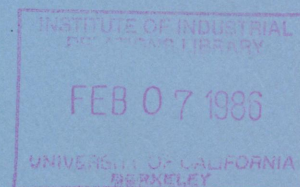
ON THE CROSS-ENVIRONMENT GENERALITY OF THE RELATIONAL VIEW OF STRESS

by

Arie Shirom*

*Arie Shirom
Visiting Professor
Graduate School of Management
U.C.L.A.
Los Angeles, California 90024

Draft: November 1985

ON THE CROSS-ENVIRONMENT GENERALITY

OF THE RELATIONAL VIEW OF STRESS

Arie Shirom
Graduate School of Management
University of California, Los Angeles

Running Head: Facetting Stress

ABSTRACT

This study was design to test the cross-environments generality of the relational view of stress, originated by Lazarus, by a comparative analysis of the structural components of stress perceptions. To the two components suggested by Lazarus (e.g., 1966), environmental demands and individual resources, a third component, qualitative vs. quantitative aspects of resources, was added. A mapping sentence, which included the three facets, provided the basis for the formulation of hypotheses and for the derivation of a set of questionnaire items. The hypotheses were tested in three different work environments, each involving a subsample selected from a sample of urban Jewish adults in Israel($\underline{n}$ = 429), using smallest space analysis and PINDIS. The results supported Lazarus' original conceptual definition of stress in that the dimensional structure obtained reflected the two facets of demand and resources. A similar structure was obtained for the three different work environments -- involving salaried employees, self-employed, and homemakers. This was interpreted as indicating that future operationalizations of the concept of social psychological stress should include those two facets, demand and resources.

ON THE CROSS-ENVIRONMENT GENERALITY OF THE
RELATIONAL VIEW OF STRESS

This research is an attempt to forge a linkage between the relational conceptualization of stress in cognitive psychology and the structure of individuals' perception of environmental demands and resources in different settings. This type of linkage was noted (Canter and Craik, 1985, p. 5) to characterize evolving trends in environmental psychology. Baum, Singer, and Baum (1981) argued that the stress concept is well-suited to analyze suboptimal environmental conditions. If so, then the critical components of stress perceptions must be identified and understood across different environments, a task undertaken in this study.

Despite the large and growing body of research on stress, researchers differ widely about its basic definition. Stress has been defined as a stimulus, a response, and a hypothetical state (Sarason, 1984; Fleming, R., 1984). This research focused on psychosocial stress, to the total exclusion of physical and/or physiological stress (like exposure to intense levels of noise, heat, or crowding, or to high levels of toxic substances). Even so, there were several alternative conceptualizations of stress to choose from, including those formulated by the followers of the person-environment fit theory (Caplan, 1983; Van Harrison, 1978), the one proposed by Beehr and Newmann (1978) on the basis of a facet analysis, and the one developed by Schuler (1980). Those conceptualizations by and large accepted the core definition of stress originated by Lazarus (1966; Lazarus & Delongis, 1983), but elaborated, extended, and otherwise modified it to include additional environmental, situational, or personality components. Lazarus' conceptualization of stress was noted to be

widely accepted among researchers (Hogan & Hogan, 1982; Shirom, 1982) this study was designed to test its generality across several different work environments by an analysis of the structural components of stress perceptions in each.

According to Lazarus (e.g., Lazarus & Launier, 1978), stress occurs when a person appraises a given relationship with his/her environment as potentially harmful or threatening in that an environmental demand is perceived to exceed or tax the person's adaptive resources. This formulation of stress underscores the importance of operationalizing stress measures to include (a) the external demand as perceived by an individual, and (b) the cognition that this external demand taxes, or exceeds, the individual's adaptive resources. Those two components of stress perceptions, demand and resources, interact in a multiplicative manner: the more severe and threatening the demand, and the greater the inadequacy or insufficiency of an employee's resources, the higher is her/his perceived stress. In the same vein, if either component is nil (i.e., adequate resources are available, or no external demand is identified), then the amount of perceive stress approaches zero. Most available stress measures ingore the basic relational nature of stress perception, and include only the environmental demand as a component in the definition of stress. This is most apparent in the role ambiguity and role conflict scales developed by Rizzo, House & Lirtzman (1970) derived from the role-theory-based view of organizational stress that has been developed by Kahn and his colleagues (1964). While these scales were criticized on both theoretical (e.g., Fineman & Payne, 1981) and methodological (e.g., Tracy & Johnson, 1983) grounds, they still constitute the predominantly used measures of stress in the literature (Jackson & Schuler, in press).

Does the stress domain include demands and taxed or threatened resources? In other words, does stress indeed reside neither in the environment nor in the person, but in the appraisal of both by the person? (cf., Lazarus & Launier,

1978; Lazarus & Cohen, 1977). The many users of the Rizzo, et al. (1970) scales of role conflict and role ambiguity could argue that a person's appraisal of his/her resources is superfluous. Followers of the person-environment theory of stress would probably argue that demands and resources are both needed in the definitional framework of stress, but that an essential additional facet of the stress domain was the aspect of the resources impinged upon by the demand, suggesting a distinction between qualitative and quantitative depleted (or otherwise threatened) resources (cf., Caplan, 1983; Van Harrison, 1978). There is an apparent need to specify a decision rule which will guide researchers in their choice of items for future research on stress. This, in turn, calls for a systematic specification of the essential facets of stress perceptions. A facet is essential if the distinct representation of its constituent elements (e.g., the qualitative and quantitative aspects of resources; conflicting and ambiguous demands) is considered necessary for an operational definition of the multi-variate concept of stress perceptions (cf. Elizur, 1984).

Facet analysis was applied in this research as the preferred strategy to define formally the universe of content of stress perceptions and to formulate hypotheses about the relationships between the definitional framework and the underlying structure of the empirical observations. Since the basic principles which guide the selection, ordering, and arrangements of facets and the derivation of hypotheses from the constructed facet design are readily available elsewhere (e.g., Canter, 1983; Shapiro & Zevulun, 1979; Shye, 1978) they will be only briefly described here.

A facet is an arrangement or classification of a universe of content according to a certain rule. The specific components of a facet are referred to as elements. Thus, resources may be classified, according to the rule of ownership, to resources that belong either to the person, to significant others,

or organizations with which s/he is associated. This study's domain was defined by the facets chosen for the definition of stress. The collection of facets and their elements may be investigated as to the structural properties of the multi-dimensional space they occupy, such as by exploring the order among facet elements and the dimensionality of the domain. The collection of facets and their elements, in which the facets are verbally interconnected (usually with few further literary additions), is referred to as a mapping sentence. A prior attempt to construct a mapping sentence of organizational stress (Shirom, 1982), was deemed too comprehensive and not easily operationalized; a questionnaire built to test it would include 480 different items (Shirom, 1982, p. 31). Therefore, on the basis of the major trends in current theory and research on stress outlined above, we chose to construct a mapping sentence based on three facets only: the facet of demands, which included ambiguous and conflicting demands as the two elements; the facet of aspect of resources being taxes or depleted, which included the two elements of qualitative and quantitative aspects; and the facet of type of resources, which included four elements: individual resources, subdivided into energy and time; social resources, represented by others' instrumental support; and organizational resources, represented by tools and equipment (cf., Shirom, 1982, pp. 28-30). Admittedly, the formally derived mapping sentence, presented below, does not cover comprehensively the universe of content, but it does identify what past theory and research suggested to be the more essential structural parameters of the conceptual space investigated here.

A profile of the mapping sentence consists of a combination of elements with each fact (except the range facet, the last one below) represented by one element. Technically, the collection of all possible profiles (2 x 2 x 4 = 16) results in a Cartesian set (Shye, 1978; Borg, 1977). When sixteen stress
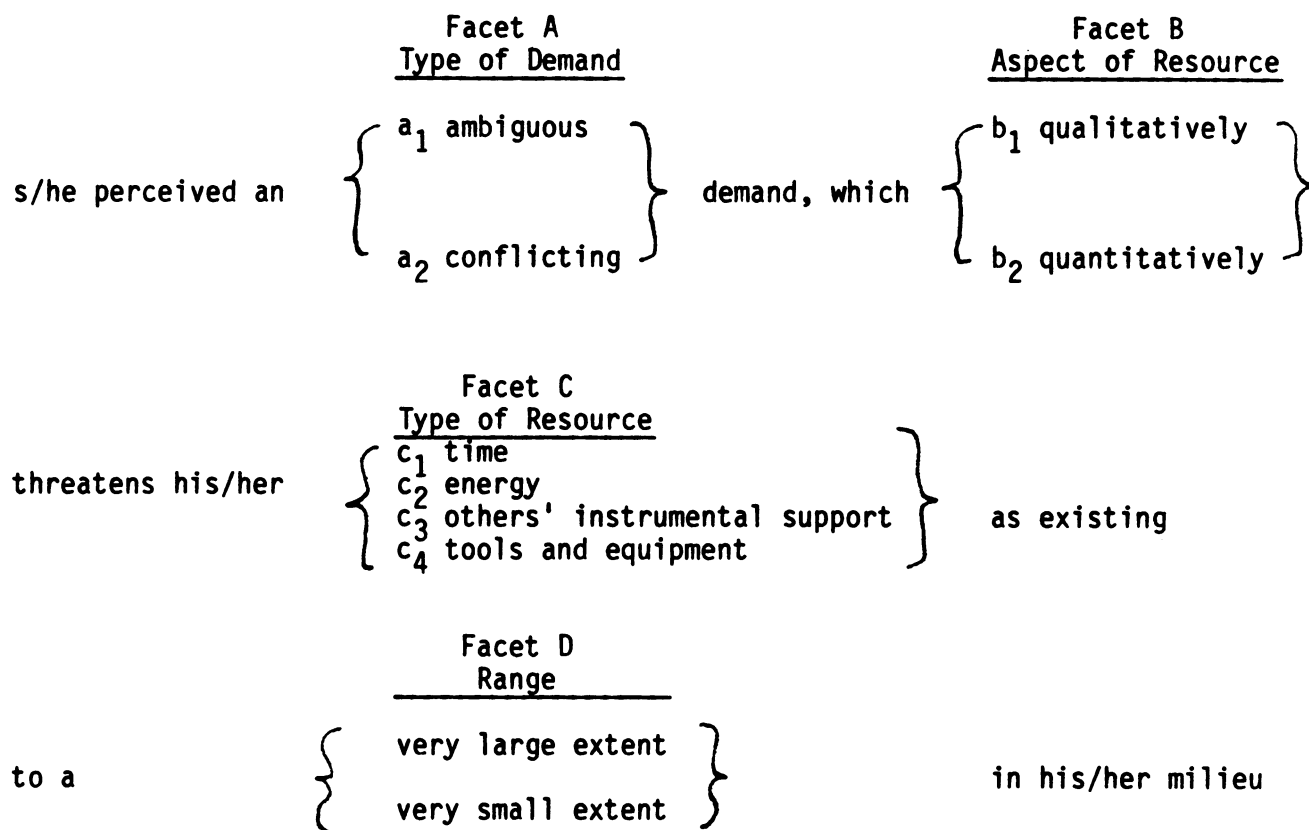
variables are defined thus to correspond to the sixteen profiles (i.e., each profile represented by a stress variable), a stress variable designates a subspace of the conceptual space of stress perceptions. (For the profile structure of the sixteen stress variables in this study, see Table 1).

The derivation of structural hypotheses from the mapping sentence is based upon the partitioning of the multidimensional space occupied by the sixteen stress variables into separate regions having specific geometric shapes (Canter, 1983; Shapira & Zevulun, 1979; Borg, 1977). In facet analysis, each facet plays a role in the hypotheses formulated.

In general, it was hypothesized that the internal structure of empirical data would reflect the three facets as three independent classifications. Hypothesis 1 stated that the first two facets, Facets A and B, would each play a polarizing role, each separating the space into two adjacent regions. Figuratively, they were expected to form four wedgelike regions emanating from a common origin in the space with each region representing a particular combination of the items in Facets A and B: a_1b_1, a_1b_2, a_2b_1, and a_2b_2. Facets A and B were each expected to act as polarizers since the literature (e.g., Jackson & Schuler, in press; Van Harrison, 1978) did not suggest any particular internal order for either of them. Facet C, type of resources, was hypothesized to have a modulating role with respect to the other two facets. The term "modulating role" means that the facet in question "arranges" the variables in different distances from the origin of the conceptual space. Resources that reside in the person himself/herself, and reflect personal efficacy, were regarded as more centrally important to the person relative to resources located in his/her social or inanimate milieu (cf., Fleming & Courtney, 1984; Fuller, Wood, Rapoport & Dornbusch, 1982). Therefore, the resources "owned" by the person were hypothesized to be more centrally located in the conceptual space.

A Mapping Sentence of Stress Perceptions

Respondent (X) assesses the degree to which

	Facet A Type of Demand		Facet B Aspect of Resource

s/he perceived an $\{$ a_1 ambiguous a_2 conflicting $\}$ demand, which $\{$ b_1 qualitatively b_2 quantitatively $\}$

Facet C
Type of Resource

threatens his/her $\{$ c_1 time
c_2 energy
c_3 others' instrumental support
c_4 tools and equipment $\}$ as existing

Facet D
Range

to a $\{$ very large extent
very small extent $\}$ in his/her milieu

Where x is . . .

The second hypothesis formulated was that the structure of interrelationships among the sixteen stress items were similar for three different work environments, involving salaried employees, self-employed, and homemakers. Replicability of the first structural hypothesis across three different work environments was considered an appropriate test of the reliability of the empirical structure found (cf., Marsden & Laumann, 1978).

METHOD

Sample

The data were collected as part of the Omnibus National Survey in Israel, conducted periodically by the Israel Institute of Applied Social Research. The population sampled is that of urban Jewish adults over twenty years old. A multi-stage sampling procedure was used: (1) nine cities in which 70% of the urban Jewish population resided were selected; (2) a systematic sampling of households, based on the population roster in the Israeli Ministry of Interior, was carried out; (3) within each selected household, a respondent was randomly selected in accordance with the Kish (1976, 398-401) method.

The fieldwork was conducted simultaneously in all cities. Out of the total 357 completed interviews, 49% were salaried employees (n = 261); 10% self-employed (n = 53); and 22% homemakers (n = 115). Retired and unemployed persons, students, and interviewees whose work status could not be ascertained were omitted from the analysis. Thus, all further references to the respondents pertain to the combined subsamples of salaried employees, self-employed and homemakers (n = 429). Respondents were about 60% males, had on the average, some high school education and were 42 years old. About a third of the respondents were Israeli-born, 42% were born in European or American countries, and the rest in Asian or African countries.

Procedure

A structured interview was used by the interviewers. Before the set of stress items, the following instructions were read to all respondents by the interviewers: "The following series of questions deals with different types of situations arising during work for many individuals. If you are a salaried employee or self-employed, you will find the questions easy to answer. If you are a homemaker, please answer the questions relating to your work in managing your household."

Measures

The three facets in the mapping sentence may be crossed in a factorial design as representing the three axes of a cubic structure. Any item in the stress questionnaire may be mapped onto a single cell in the cube. An element from each of the three facets was explicitly specified in each item, resulting in a total of sixteen items. To illustrate, the first item asked was, "To what extent is your time at work wasted facing ambiguous demands addressed to you?" Having a profile (facet structure) of $a_1b_1c_1$; the profile of $a_2b_2c_2$ was represented by the the item: "To what extent do conflicting demands which you face in your work use up your energy?" The response categories ranged from "To a very large extent" scale value of 1) to "to a very small extent" scale value of 5). As the original total sample included non-working adults, such as retirees, a sixth response category was added: "This situation does not exist for me at all" (scale value of 6). The sixteen items in the questionnaire which constitute the stress variables analyzed, are described, in an abbreviated form, in Table 1.

Employment status was determined by the response to a single item which asked whether the respondent was a salaried employee, self-employed, unemployed, retired, full-time student, or homemaker.

Analysis

The measure of association used in the data analysis is Guttman's correlation coefficient of weak monotonicity (Guttman, 1977; Lingoes, 1973). When applied to five- or six-point scales, such as those used in this study, those coefficients were shown (Maimon, 1978) to yield values which were strongly correlated ($r = .97$) with the corresponding values of the more commonly used Pearson's product-moment correlation coefficients. Nonetheless, because of the skewed distributions of the stress variables under consideration and the number of ties in their interrelationships, Guttman's measure of association was used in preference to alternative ones (cf., Levy & Guttman, 1975, p. 452).

For each category of respondents, the hypothesis was tested by subjecting the matrix of intercorrelations among the sixteen stress variables to smallest space analysis (SSA). For two out of the three categories of respondents, this matrix is depicted in Table 1. SSA is a family of algorithms developed by Guttman (1968) and Lingoes (1973), favorably compared with other available multidimensional scaling analysis algorithms (Davison, 1983, pp. 89-94). Useful illustrations of SSA's uses were provided by Canter (1983). Briefly explained, SSA belong to the family of spatial distance multidimensional scaling, the most widely used in science (Carrol & Arabie, 1980, p. 612). The specific algorithm used is SSA-I (Lingoes, 1973). It represents a symmetric matrix of intercorrelations by a configuration of points in a Euclidian space; each variable (a stress variable or a questionnaire item in this study) is represented by a point in this space. The algorithm was programmed to represent the correlation matrix of the relevant variables by the following basic rule: if $r_{ij} > r_{kl}$, then $d_{ij} < d_{kl}$, where r, in the present context, refers to the monotonicity coefficient and d is the Euclidean (spatial) distance between the two points in the space diagram (space diagrams are illustrated in Figures 1, 2,

and 3). The SSA-I procedure is designed to map monotonically the order of the data into a set of distances within a space of minimum dimensionality. To achieve this mapping, a badness-of-fit, or loss function, is minimized. This function, the coefficient of alienation, k, varies between 0 and 1. It measures the correspondence between the ds and a monotonic transformation of the correlations; the lower its value, the better the correspondence.

The configuration of points in the space diagrams can be partitioned to several regions associated with elements of the facets, and this partitioning may provide evidence supporting or refuting the hypothesized facet structure for any number of dimensions (for further details, see Canter, 1983). In each space diagram, i.e., Figures 1 to 3, the axes of the configurations of points are arbitrary, hence were left unlabelled. The regions were identified on the basis of the mapping sentence and were drawn by hand.

For each category of respondents, we used the first two-dimensional solution from the set of three-dimensional solutions. This configuration was found to be very similar to the respective two-dimensional solution, but provided a more easily interpretable planar projection. This is a common practice among SSA-I users (e.g., Levy & Guttman, 1975; Shirom, 1980a). To determine the number of dimensions, we used the coefficient of alienation (Guttman, 1968). As noted, this is a measure of the consistency between the interpoint distances in the multidimensional space and the interitem correlation matrix. A coefficient of less than .15, generally considered satisfactory (Bergermaier, Borg & Champoux, 1984, p. 171), was obtained for all three SSA solutions (see Figures 1, 2, and 3).

Given the increased utilization of smallest space analysis in the behavioral sciences (for recent examples, see Ben-Porat, 1981; Elizur, 1979; Ronen & Kraut, 1980; Shirom, 1980a, 1980b; Shye, 1978; Canter, 1985), the problem of comparisons between the smallest space solutions obtained from different subsamples

of the same sample arises quite often. In view of this, an algorithm, the procrustean individual differences scaling (PINDIS) procedure, was developed to compare structures of interrelationships among variables for several groups of individuals (see Lingoes & Borg, 1978; Maimon, Venezia & Lingoes, 1980). The input to PINDIS is the matrix of coordinates for the N-dimensional space resulting from SSA-I analysis. It is then transformed to produce several measures of fit or similarity among each of the matrices examined and a centroid matrix (Maimon, et al., 1980, pp. 730-731).

RESULTS

The frequency distributions of the stress items in the questionnaire were all highly skewed, with the majority of respondents opting for response categories 5 ("to a very little extent") and 6 ("this situation does not exist for me"). Table 1 presents a brief description of the 16 stress variables, their intercorrelation matrices for salaried employees and self-employed, and the profile structure of each stress variable. For all three correlation matrices analyzed, the average monotonicity coefficient was .43, signifying a moderate association among the stress variables considered.

INSERT TABLE 1 ABOUT HERE

The proportion of respondents in the highest two categories, "to a very large extent" (scale value of 1) and "to a large extent" (scale value of 2), ranged from 9 percent (items 1, 2, 5, and 9) and 3 percent (items 7, 11, 12, and 15). These results were quite comparable to those reported by Warr and Payne (1983). In their study of the prevalence of unpleasant emotional experience during a workday in a representative sample of employed adults, about two-thirds of the full-time employed adults reported no such experiences. The proportion of those who selected the response categories of "most of the time" and "all of

the time" ranged from 6 percent for employed men to 9 percent for employed women (Warr & Payne, 1983, p. 95).

INSERT FIGURES 1, 2, AND 3 ABOUT HERE

The first hypothesis dealt with the role played by each of the three facets in the conceptual space. Observing the space diagrams in Figures 1, 2, and 3, which depict the structure of interrelationships among the stress variables for the work environments of salaried employees, self-employed, and homemakers, respectively, one can easily see that Facet A, type of demand, partitioned the space into two regions according to the predetermined definitional framework of the mapping sentence. Facet B, however, failed to act as a polarizer in either Figure 1, 2, or 3.

Facet C, type of resource, was expected to play a modulating role -- which it clearly did in Figures 1 and 2, and somewhat less so in Figure 3. In all figures, Facet C ordered the conceptual space from center to periphery. In each, two circular bands around a common origin were drawn. It was further hypothesized that stress variables which include in their profile elements c_1 and c_2, reflecting the personal resources of time and physical strength, would be found in the innermost circular band, indicating the more pivotal role which these resources play in the perception of stress relative to the two other types of resources, social and organizational. This expectation was not confirmed. Social resources appeared in the innermost band in Figures 2 and 3, displaying the space diagrams for salaried employees and homemakers, respectively, and organizational resources occupy the center circular region in Figure 2, representing the conceptual space of the self-employed respondents. There are few and slight deviations from the hypothesized structural arrangements: in Figures 1 and 3, variable 3 was not located in the expected region, and the same was true for variable 16 in Figure 3.

A visual comparison of the three figures led us to conclude that they reflect essentially the same pattern in the structure of interrelationships among the stress variables, in that Facets A and C fulfilled the expected role and Facet B disconfirmed the hypothesized role for each of the three categories of respondents. Since a visual inspection may yield inaccurate conclusions, the three matrices of ds were subjected to PINDIS analysis.

INSERT TABLE 2 ABOUT HERE

The results obtained for the PINDIS analysis are reported in Table 2. Each row in Table 2 represents a series of five measures of the goodness of fit or similarity between two configurations. X_i is the coordinate matrix of individual i from which the d's in SSA-I can be generated. Z is the centroid of the X_is, analogous in the present case to the average of all three coordinate matrices. Various transformations are performed on z to optimally fit the X_is. The first column, labelled $r^2(X_i Z)$, provides a goodness of fit measure analogous to the proportion of variance shared by the two configurations, X_i and Z. The second two measures are based on dimensional weightings, while the last two measures are based on vector weightings (for full details see Maimon et al., 1980, pp. 730-731). The second hypothesis formulated, namely that the interrelationships among the sixteen stress items share a similar structure for the three categories of work environments, is substantially supported by the PINDIS results. The three matrices have about the same degree of similarity to the centroid: this is inferred from the low variability of the r^2s in each column of Table 2. The last row in Table 2 indicates that the three configurations have, on the average, at least 79% of their variance in common with the centroid under different weighting procedures. In the fifth column of Table 2, that of vector weighting with idiosyncratic origins (Maimon, et al., 1980), the differences between the configurations disappear almost completely.

DISCUSSION

This research was guided by the Lazarusian view of stress (e.g., Lazarus & Launier, 1978; Lazarus & Cohen, 1977). According to it, persons actively interact with their environment, appraising potentially threatening demands addressed to them, by a variety of agents in their environment, in light of their available coping resources. From this perspective, a stress perception occurs only when both (a) a demand is appraised by a focal person as addressed to him/her, and (b) it is appraised as threatening in that it taxes or otherwise exceeds this person's available coping resources. The assumed centrality of the above relationship in the cognitive appraisal process defining a stress perception has led to very few attempts to construct nomologically parallel measures to gauge stress perceptions among individuals. Most available stress scales tape role conflict and role ambiguity, and do so by assessing the extent to which a person perceives a certain environmental demand addressed to him/her, to exist. The objective of this research was to map out the structure of stress perceptions, using as a springboard Lazarus' conceptualization and adding to it a definitional framework was constructed by means of facet analysis.

Two strategic decisions were made. First, it was decided to consider the whole array of intercorrelations among the stress variables in order to discover whether the spatial pattern of distances among them reflect the components of the conceptual space that was predetermined. As noted by Stokols (1978, p. 174), the generalizability of stress responses across behavioral settings as not been adequately examined. Therefore, the second decision was made to test the replicability of the above spatial pattern across three different work environments. Having made those strategic decisions, SSA suited us optimally in that it provided, in a summary-like fashion, the overall structural configuration of the stress variables, and in that it allowed us the simultaneous testing of a set of interdependent hypotheses.

On the whole, for each of the work environments considered, the structure of the spatial representation of the sixteen stress variables is that of an unordered or qualitative facet (Canter, 1983), namely conflicting or ambiguous demands (Facet A) being modulated by another facet, the taxed or threatened resources (Facet C). These results provide strong support to the assumed centrality of the demand-resource relationship in the cognitive appraisal process defining a stress perception according to Lazarus (1966). Facet B was found to be superfluous in that it did not entail a systematic partitioning of individual stress perceptions in terms of its two elements: the use (or overuse) of resources and the misallocation of resources impinged upon the external demand. However, the possibility that this result may be due to the specific operationalization of element b_1 (i.e., qualitative aspects of resources defined as waste or spoilage of resources) should be investigated using different operationalizations of this facet (e.g., misuse or impairment of resources) with additional items and on additional populations.

The core resources were shown to be dependent on the category of respondents: for salaried employees and homemakers, social resources; for self-employed, organizational resources. It could be that salaried employees regard time, and to some extent, energy not as personal resources, but as organizational resources in the sense that they had been "bought" and paid for by the employer. If this interpretation is correct, then the analogous regional positions of personal and organizational resources in Figure 1 is quite reasonable. The finding that for homemakers, social resources, rather than the hypothesized personal resources, occupied the central region of the conceptual map (as represented by Figure 3) is perhaps related to the established fact that women tend to value more highly and attach more importance to the social aspects of their work environment relative to men (Jurgensen, 1978). Considering the classificatory rule of "ownership" used to construct Facet C, resources, it is perhaps not

surprising that for the self-employed individuals organizational resources were positioned in the centermost circular region (Figure 2). For them, personal and organizational resources are coextensive; our results suggest that the latter resources, perhaps because of their relative scarcity and relative replinishability in comparison with personal resources, were the most important and the more closely interconnected.

There is abundant research on the direct (i.e., main) and moderating effects of social support received from peers and superiors on employees' perceptions of stress and their personal and organizational maladaptive consequences (e.g., Payne, 1980). However, the role that social support plays with regard to the stress perceptions of homemakers has hardly been subjected to an empirical investigation. Our results, portrayed in Figure 3, strongly suggest that this might be a fruitful avenue for future research. Future research may elaborate further a mapping sentence based on Facets A and C, adding additional facets suggested by Shirom (1962), or by Schuler (1980), and thus, exploring the possibilities of further refining the conceptual space of stress perception.

In summary, this study's findings allow a better understanding of the dimensional parameters of the stress domain, which, in turn, could facilitate integration of theory and aid in the selection of items for future stress research. To paraphrase Keating (1979), the lesson for psychologists interested in the environment is clear: the environment-person relationship must be studied as an interactive unit.

REFERENCES

Baum, A., Singer, J.E. & Baum, C.S. (1981), Stress and the environment, Journal of Social Issues, 37, 4-35.

Beehr, T.A. & Newman, J.E. (1978), Job stress, employee health, and organizational effectiveness: a facet analysis model, and literature review, Personal Psychology, 31, 665-699.

Ben-Porat, A. (1981), Event and agent: toward a structural theory of job satisfaction, Personnel Psychology, 34, 523-534.

Bergermaier, R., Borg I., & Champoux, J. (1984), Structural relationships among facets of work, nonwork, and general well-being. Work and Occupations, 11, 163-181.

Borg, I. (1977), Some basic concepts of facet theory. In J.L. Lingoes (Ed.), Geometric Representation of Relationship Data, (pp. 65-102), Ann Arbor, MI: Mathesis Press.

Canter, D.V. & Craik, K.H. (1981), Environmental psychology, Journal of Environmental Psychology, 1, 1-11.

Canter, D.V. (1983)), The potential of facet theory for applied social psychology, Quality and Quantity, 17, 35-67.

Canter, D.V. (Ed.) (1985), Facet Theory, N.Y.: Springer-Verlag.

Caplan, R.D. (1983), Person environment fit: past, present, and future. In C.L. Cooper (Ed.), Stress Research (pp. 35-78), N.Y.: Wiley.

Carroll, J.D. & Arabie, P. (1980), Multidimensional scaling. In M.R. Rosensweig & L.W. Porter (Eds.), Annual Review of Psychology, Vol. 31, (pp. 607-649), Palo Alto, CA.: Annual Reviews, Inc.

Davison, M.L. (1983), Multidimensional Scaling, N.Y.: Wiley.

Elizur, D. (1973), Assessing achievement motive of American and Israeli managers: design and application of a three-facet measure, Applied Psychological Measurement, 3, 201-212.

Elizur, D. (1984), Facets of work values: a structural analysis of work outcomes, Journal of Applied Psychology, 69, 379-389.

Fineman, S. & Payne, R. (1981), Role stress - a methodological trap?, Journal of Occucpational Behavior, 2, 51-64.

Fleming, J.S. & Courtney, B.E. (1984), The dimensionality of self-esteem: II. hierarchical facet model for revised measurement scales. Journal of Personality and Social Psychology, 46, 404-421.

Fleming, R. (1984), Toward an integrative approach to the study of stress, Journal of Personality and Social Psychology, 46, 939-949.

Fuller, B., Wood, K., Rapoport, T., & Dornbusch, S.M. (1982), The organizational context of individual efficacy, Review of Educational Research, 52, 1-30.

Guttman, L. (1977), What is not what in statistics, The Statistician, 26, 81-107.

Guttman, L. (1968), A general non-metric technique for finding the smallest coordinate space for a configuration of points, Psychometrika, 33, 465-506.

Hogan, R. & Hogan J.C. (1982), Subjective correlates of stress and human performance. In E.A. Alluisi & E.A. Fleishman (Eds.), Human Performance and Productivity, Vol. 3 (pp. 141-163), N.J.: Erlbaum.

Jackson, S.E. & Schuler, R.S. (in press), A meta-analysis and conceptual critique of research on role ambiguity and role conflict in work settings, Organizational Behavior and Human Performance.

Jurgenson, C.E. (1978), Job preferences. Journal of Applied Psychology, 63, 267-276.

Kahn, R.L., Wolfe, D.M., Quinn, R.P., Snoek, J.D. & Rosenthal, R.A. (1964), Organizational Stress: Studies in Role Conflict and Ambiguity, N.Y.: Wiley.

Keating, J.P. (1979), Environmental stressors: misplaced emphasis. In I.G. Sarason & C.D. Spielberger (Eds.), Stress and Anxiety, Vol. 6 (pp. 55-66), N.Y.: Halstead Press.

Kish, L. (1965), Survey Sampling, N.Y.: Wiley.

Lazarus, R.S. & Cohen, J.B. (1977), Environmental stress. In I. Altman & J.F. Wohlwill (Eds.), Human Behavior and the Environment Current Theory and Research, Vol. 2 (pp. 89-127), N.Y.: Plenum.

Lazarus, R.S. & Launier, R. (1978), Stress-related transactions between person and environment. In W.A. Pervin & M. Lewis (Eds.), Perspectives in Interational Psychology (pp. 287-327), N.Y.: Plenum.

Lazarus, R.S. & Delongis, A. (1983), Psychological stress and coping in aging. American Psychologist, 38, 245-254.

Levy, S. & Guttman, L. (1975), Structure and dynamics of worries, Sociemetry, 38, 445-473.

Lingoes, J.C. (1973), The Guttman-Lingoes Non-Metric Program Series. Ann Arbor, MI: Mathesis Press.

Lingoes, J.C. & Borg I. (1978), A direct approach to individual differences scaling using increasingly complex transformations, _Psychometrika_, _43_, 691-519.

Maimon, Z. (1978), The choice of ordinal measures of association, _Quality and Quantity_, _12_, 255-265.

Maimon, Z., Venezia, I & Lingoes, J.C. (1980). How similar are different results? _Quanlity and Quantity_, _14_, 727-742.

Marsden, P.V. & Laumann, E.O. (1978), The social structure of religious groups: a replication and a methodological critique. In S. Shye (Ed.), _Theory Construction and Data Analysis in the Behavioral Science_ (pp. 81-112). San Francisco: Jossey-Bass.

Payne, R. (1980), Organizational stress and social support. In C.L. Cooper & R. Payne (Eds.), _Current Concerns in Occupational Stress_, (pp. 269-298), Chichester, England: Wiley.

Payne, R. (1979), Demands, supports, constraints, and psychological health. In C. McKay & T. Cox (Eds.), _Responses to Stress: Occupational Aspects_, London, UK: IPC Science and Technology Press.

Rizzo, J.R., House, R.J., & Lirtzman, S.I. (1970). Role conflict and ambiguity in complex organizations. _Administrative Science Quarterly_, _15_, 150-163.

Ronen, S. & Kraut, A.I. (1980), An experimental examination of work motivation taxonomies. _Human Relations_, _33_, 505-516.

Sarason, I.G. (1984), Stress, anxiety, and cognitive interference: reactions to tests, _Journal of Personality and Social Psychology_, _46_, 929-938.

Schuler, R.J. (1980), Definition and conceptualization of stress in organizations. _Organizational Behavior and Human Performance_, _25_, 184-215.

Shapira, Z & Zevulun, E. (1979). On the use of facet analysis in organizational behavior research: Some conceptual considerations and an example. _Organizational Behavior and Human Performance_, _25_, 184-215.

Shirom, A. (1980a), Foremen's comparison groups for equity for equity assessment. _Journal of Occupational Behavior_, _1_, 128-137.

Shirom, A. (1980b), Dimensionality of the attitudinal militancy of local union officers. _Journal of Occupational Behavior_, _1_, 285-296.

Shirom, A. (1982), What is organizational stress? A facet analytic conceptualization. _Journal of Occupational Behavior_, _3_, 21-37.

Shye, S. (Ed.) (1978), _Theory Construction and Data Analysis in the Behavioral Sciences_, San Francisco, CA: Jossey-Bass.

Stokols, D. (1978), Environmental psychology. In M.R. Rosenzweig & L.W. Porter (Eds.), _Annual Review of Psychology_, _29_, (pp. 253-295). Palo Alto, CA: Annual Reviews.

Tracy, L. & Johnson, T.W. (1983), Measurement of role stress: dimensionality of scale items. Social Behavior and Personality, 11, 1-17.

Warr, P. & Payne, R. (1983), Affective outcomes of paid employment in a random sample of British workers. Journal of Occupational Behavior, 4, 91-104.

Van Harrison, R. (1978), Person-environment fit and job stress. In C.L. Cooper and P. Payne (Eds.), Stress at Work (pp. 175-209), N.Y.: Wiley.

Table 1

Intercorrelations and profile structure of the stress variables for the Salaried Employees (above diagonal) and Self Employed (below diagonal)

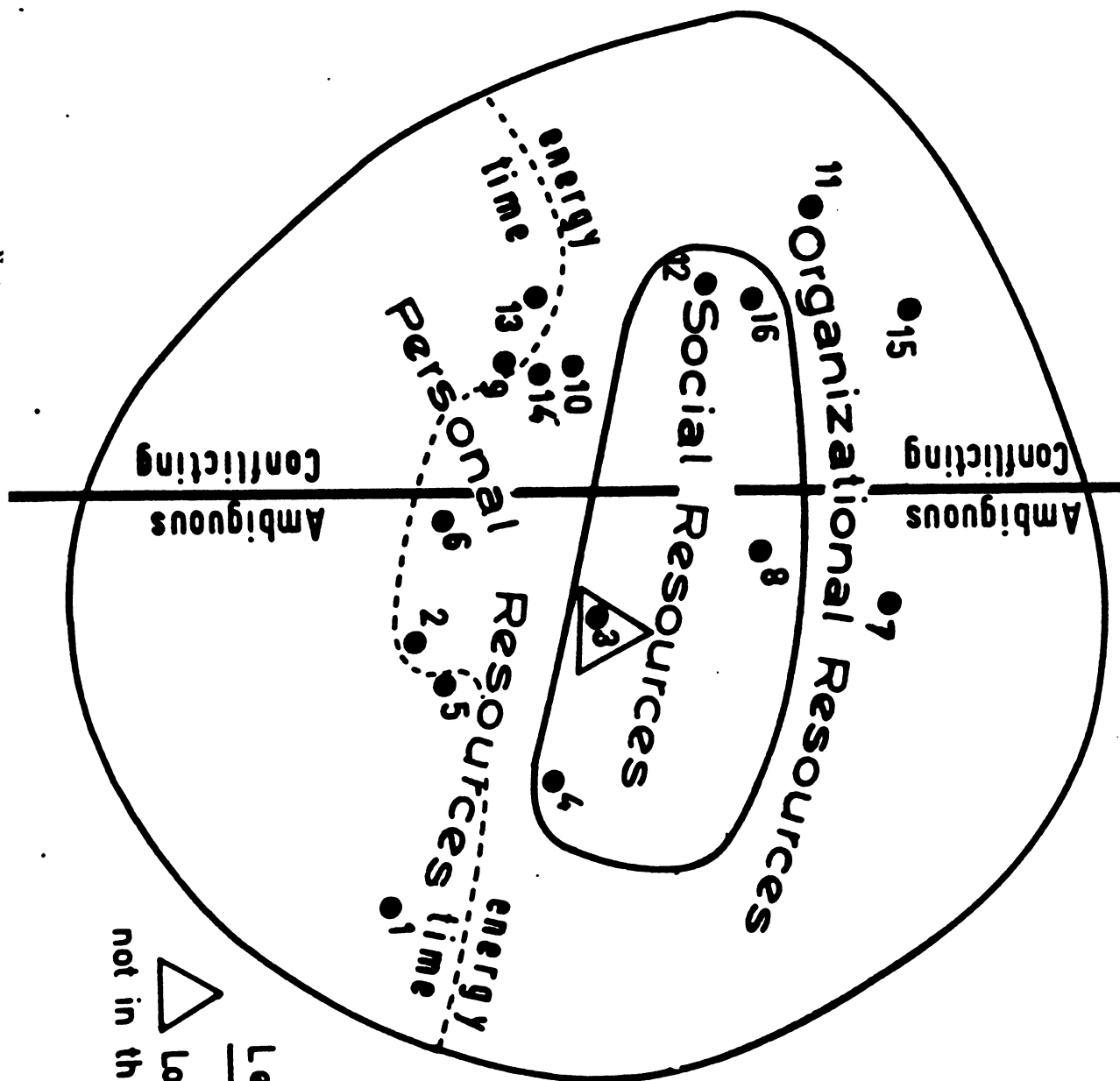|	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Profile Structure
A. To Withstand Ambiguous Demands--																	
1. Waste time	-	58	36	48	46	39	32	35	34	33	20	32	30	32	23	24	$a_1b_1c_1$
2. Waste physical strength	84	-	55	51	67	64	34	45	58	57	39	44	43	53	31	41	$a_1b_1c_2$
3. Waste tools and equipment	57	60	-	45	53	44	44	41	46	43	56	37	45	39	37	28	$a_1b_1c_3$
4. Misuse support from others	43	37	48	-	60	50	43	44	33	39	32	52	44	46	33	31	$a_1b_1c_4$
5. Do not have enough time	73	61	31	51	-	66	41	35	50	51	33	44	48	54	34	33	$a_1b_2c_1$
6. Do not have enough strength	59	43	31	51	78	-	39	43	48	57	36	47	60	68	46	37	$a_1b_2c_2$
7. Have insufficient tools and equipment	66	50	49	59	76	65	-	49	37	42	48	37	31	33	55	35	$a_1b_2c_3$
8. Have insufficient support from others	51	35	51	70	58	42	73	-	42	46	38	42	40	43	49	57	$a_1b_2c_4$
B. To Withstand Conflicting Demands--																	
9. Waste time	47	54	59	52	31	55	32	26	-	79	53	46	60	59	40	53	$a_2b_1c_1$
10. Waste physical strength	49	50	34	57	54	57	39	33	72	-	53	55	62	68	43	62	$a_2b_1c_2$
11. Waste tools and equipment	52	54	60	69	47	41	67	65	47	56	-	56	55	60	50	44	$a_2b_1c_3$
12. Misuse support from others	30	38	43	82	45	38	47	58	47	58	77	-	60	60	54	55	$a_2b_1c_4$
13. Do not have enough time	45	43	44	75	48	42	63	55	48	61	81	69	-	70	41	53	$a_2b_2c_1$
14. Do not have enough strength	41	47	48	67	48	52	65	56	52	63	84	72	82	-	46	45	$a_2b_2c_2$
15. Have insufficient tools and equipment	52	51	60	56	46	39	69	70	43	54	97	75	80	83	-	58	$a_2b_2c_3$
16. Have insufficient support from others	45	39	54	56	39	39	58	71	42	56	83	64	60	71	90	-	$a_2b_2c_4$

Note: The correlation coefficients are Guttman's weak monotonicity coefficients. Decimal points have been omitted. $\underline{N}$ = 261, 53 for respectively the salaried employees and the self-employed.

Table 2

Results of PINDIS Analysis of the Correlation Matrices
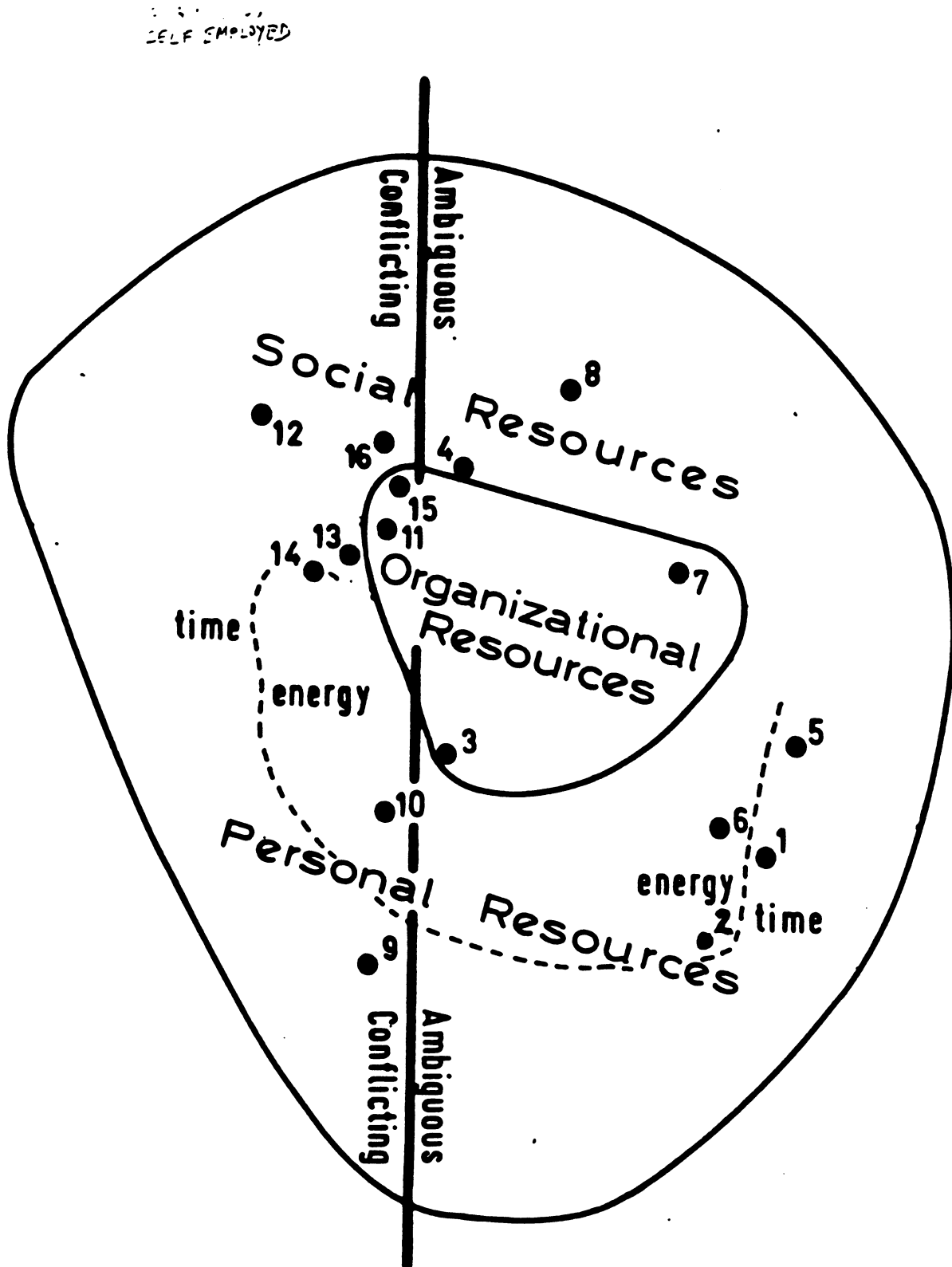
for the Three Categories of Respondents

Respondents' Category	Type of transformation performed on matrices				
	$r^2(X,Z_i)$	$r^2(ZW_i,X_i)$	$r^2(Z_i^r W_i^r,X_i)$	$r^2(V_i,Z_i,X_i)$	$r^2(V_i^t,Z_i^t,X_i)$
Salaried employees	.77	.77	.78	.92	.95
Self employed	.73	.74	.74	.82	.92
Homemakers	.87	.88	.88	.93	.98
Mean r^2	.79	.80	.80	.91	.95

Figure 2. Smallest space diagram of the 16 stress variables for self-employed employees.

Figure 3. Smallest space diagram of the 16 stress variables for homemakers.
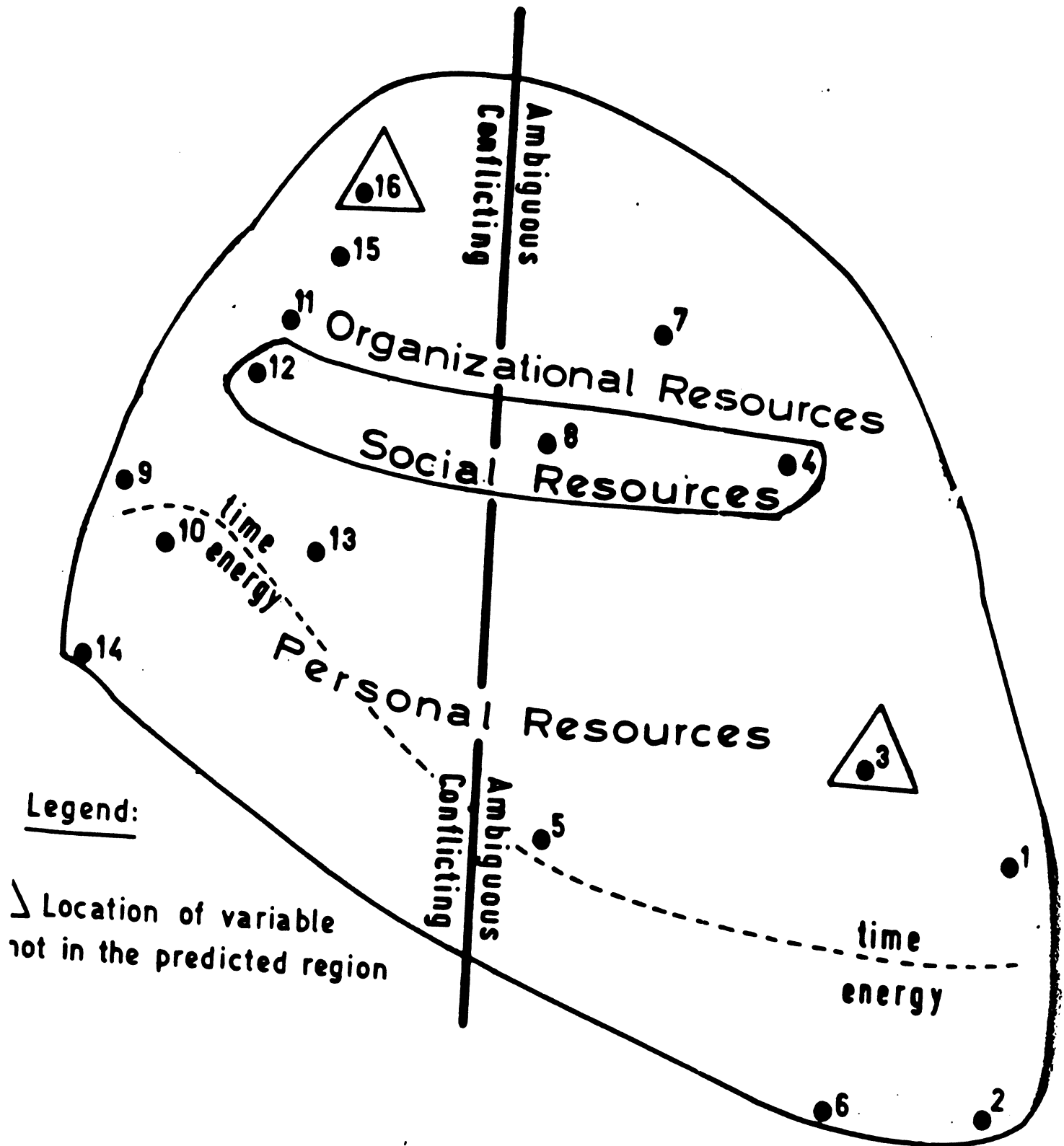
Note. The coefficient of alienation = .08.