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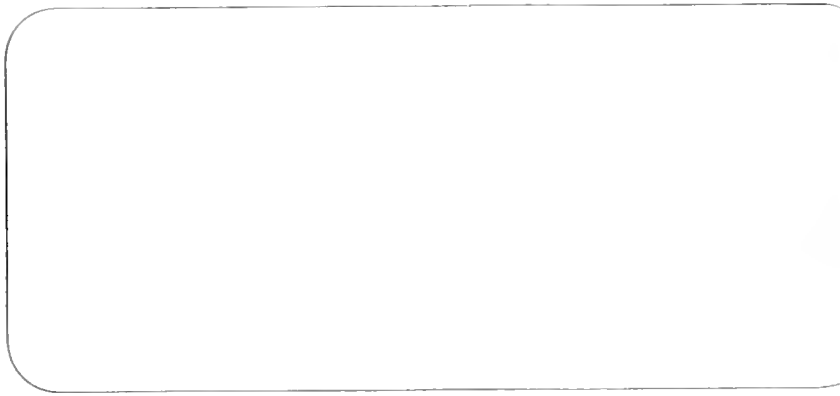
Faculty Working Papers

The Development of a Managerial Differential

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THE DEVELOPMENT OF A MANAGERIAL DIFFERENTIAL

by

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Introduction

The research reported in this working paper is part of an attempt to examine the meaning of management by means of the semantic differential technique. In this introductory section several points will be discussed: the motivation for the research, scope and limitations of the research presented in this paper, and a brief discussion of the main parts of the paper.

Motivation. The two ideas that were most influential in motivating the writer to undertake this research were those of affective meaning and measurement. One of the phenomenons of the 1960's was the emphasis on affective meaning or how people feel about ideas, things, or people. Affective meaning is complementary to denotative meaning or cognitive meaning, which refers to how people think about ideas, things, or people. During the 1960's cognitive meaning often was considered secondary to affective meaning. Thus, "I know what it is, but how do you feel about it," was an often-heard response to attempts by people to "define" something.

The feeling emphasis often takes bizarre forms as in some encounter groups, personal growth experiences, and, perhaps, some aspects of the youth cult. However, the emphasis on feeling can more commonly be found in very prosaic situations. There seems to be a pervasive cultural acceptance of the idea that feelings and emotions are legitimate dimensions of reality, and that these dimensions have been given inadequate attention in the past. If there sometimes seems to be an overemphasis today on feelings and emotions perhaps it is due to a previous lack of emphasis on these aspects of reality.

The new importance of feeling has had its impact on management education, development, and practice. In terms of management education the importance of feelings, emotions, sentiments, and general affect is acknowledged in education concerned with change, supervisory skills, controls, organizational structure, and conflict. In the writer's management classes over the past four years substantially more attention has been given to efforts that may help students "experience" and "feel" decision-making, planning, authority, stages of group development, change, pressure, and the superior-subordinate relationship. These efforts can be found in management classes in almost all universities. In addition, management literature has also been concerned with affective considerations. The literature dealing with problems of integrating individuals and organizations is very affective in tone. The same is true of the literature on change and conflict. There is even a mild controversy centering around the relative importance of affective versus structural considerations in improving organizational performance.

Management development in the 1960's has emphasized affect through sensitivity training, grid exercises, group techniques, and lecture and case material dealing with the importance of feelings and emotions in the managerial job. Finally, managerial practice has been influenced by the new emphasis on affect. Managers live in and help create the culture that now appears to recognize the importance of feelings and emotions. It should not be surprising that their behavior has been influenced by this new awareness.

In terms of management, the main interest of this research, it seems clear to the writer that the idea of affective meaning is important in understanding the meaning of management. Whether for better or worse, management

means more than some set of functions that managers perform; it means more than creating a climate or making decisions. It means all of these things to some people but it also means a set of feelings toward whatever it is that makes up that content domain known as management. How do people "feel" about authority, schedules, control, This research attempts to examine the affective meaning of management.

In addition to affective meaning, the idea of measurement was influential in motivating this research. The effort to examine the affective meaning of management implies some attempt to find dimensions of meaning. In addition, since an interest in this research was the comparison of sentiments of managers with sentiments of students towards management, some standard of comparison was essential. There could be many approaches taken to the measurement of affective meaning but the semantic differential technique was selected for purposes of this research. The technique has been shown to be a powerful research tool for quantitatively studying affective meaning.

A Semantic Differential (SD) is a collection of rating scales anchored by bipolar adjectives. It is a method or technique of rating, usually on a seven-step scale, "concepts," which can be anything that can be named. The bipolar adjectives that anchor the rating scales are chosen from a universe of such scales representing adjectives appropriate to a particular research area, in this case, management. What results from the administration of a SD is a measurement of the connotative or affective meaning of concepts.

Since its development by Charles Osgood (8), the SD has been used in numerous studies in the social and behavioral sciences. A sourcebook on

the SD technique is available which references over 1000 articles on the SD technique (9). The SD technique has been studied in terms of usual reliability and validity criteria. The reader interested in such studies are referred to Snider and Osgood (9).

Scope and limitations. This working paper is primarily concerned with the procedure and methodology followed in the construction of a SD that subsequently will be used in measuring the sentiments of managers and students toward management concepts. The paper will not discuss the logic of the semantic differential technique nor will it discuss many of the methodological considerations that arise in the construction and administration of a semantic differential. The assumption has been made that most readers of this paper have a working knowledge of the semantic differential technique and some of its methodological considerations and that they would be more interested in a discussion of the procedure and results of this particular study which applies the SD technique to the management content domain.

A second limitation in the scope of the paper is that this paper reports on only one part of the overall research: the construction of a "managerial differential," that is, a set of bipolar seven-interval scales that would seem to be useful in eliciting from managers and students multi-dimensional sentiments toward management-related concepts. The data obtained in this research can be used for a variety of analyses and will be the subject of additional papers.

Main parts of the paper. The first step in constructing a SD is to select concepts that will represent the area being studied. Procedures followed in concept selection are discussed in the first part of this paper.

A discussion of some guides for selecting concepts is also included along with a listing of the 61 concepts used in this study. The second step in SD research is the development of bipolar scales that will be used to rate the concepts. The elaborate procedure for scale selection is discussed in the second part of this paper along with a discussion of guides for selecting scales and a listing of the 49 scales used in this study. The third part of the paper is a brief discussion of the sample and administration of the SD. Finally, the main analysis of the paper is discussed under the heading factor analysis of scales. This section concludes with a twenty-scale SD tentatively called a "Managerial Differential."

Concept Selection

The first step in constructing a SD for research use is to select the concepts or stimuli that will represent the content area being studied. Concept selection is an extremely important part of a SD study because an unfortunate choice of concepts can lead to completely misleading results.

A "concept" in a SD study refers to the stimulus to which the subject's checking operation on rating scales anchored by bipolar adjectives is a terminal response. The concepts judged against a semantic differential can take a variety of forms: pictures, sentences, nouns, music, and descriptions of real incidents. Anything that can be named can be rated. The nature of the problem being studied determines the class and form of concepts to be selected. In the present study all concepts are nouns representing a concept of some relevance to management. Examples of concepts used are: authority, profit, freedom, businessman, leadership, and computers.

Guides for selecting concepts. In selecting concepts to represent management it is not possible to pick all of the concepts relevant to that area. Some sampling is necessary. Osgood (8, 77-78) has suggested the following criteria for the use of "good judgment" in concept selection: (1) try to select concepts for which you can expect considerable individual differences in meanings, (2) try to select concepts with a single unitary meaning for the individual, and (3) try to select concepts which can be expected to be familiar to all subjects. In addition to these three criteria, there is the general requirement that the concepts be both relevant to and representative of the area of research interest. Finally, Heise (2, 419) has written on the total number of concepts to be used in SD research. The number depends on the study design but forty concepts appear to be a reasonable lower bound where mean ratings for concepts are the units of observations for correlation and factor analysis. Sixty-one concepts are used in the present study.

The concepts selected for the present study meet most of the above criteria. The procedure used in concept selection gave adequate assurance that the concepts would be relevant to management. The concepts used were familiar to all subjects with one known exception - marketing. One subject considered marketing to be going to the grocery store. The concepts do not in every case have a single unitary meaning. For example, authority is a familiar term to most people but probably does not have a unitary meaning. Furthermore, the subjects were requested to think of the concepts in general terms. That is, to think of authority as an abstract notion and not in terms of a specific person, position, or situation. This approach undoubtedly reduced the unitary meaning of the concepts. However, the purpose of the research was to obtain feelings or reactions to general management concepts.

The requirement that concepts be such that considerable individual differences in meanings will be obtained was partially met. None of the concepts elicited predominately negative responses. Nevertheless, individual responses on all seven intervals of the bipolar scales were present, although most responses tended to be on the positive side of the scales.

The criterion of representativeness needs some extended discussion. What does it mean to say that concepts in a SD study should be representative of the content area? Representativeness can be taken to mean simply that the concepts should include words that bring out the full meaning of the management area. In this sense the problem of representativeness is no different than that to be found in any sampling study. Samples should be "representative" of the population. The procedure used for selecting concepts for this study gave some assurance that they would be representative of the management area. They were capable of eliciting varied responses and thus large variances.

On the other hand, there is another meaning of representativeness that is somewhat unique to SD research. Heise (4, 419) suggests that one must have concepts which represent as nearly as possible the entire semantic space. Kerlinger (6, 569) also states that concepts must cover, to some extent, the semantic space. This means that concepts should be distributed over the three dimensions of meaning commonly found in SD research: Evaluation, Potency, and Activity. The rationale for this requirement is that numerous factor-analytic studies of semantic-differential scales have shown that Evaluation, Potency, and Activity are salient characteristics of the human affective system. If a SD research study has as its purpose the discovery of the meaning of a concept area, then

concepts must be chosen that are representative of these three major factors. In order to meet the representativeness criterion SD dictionaries can be consulted in which the ratings of various concepts have been reported. One such dictionary can be found in Suider and Osgood (9, 625). For example, authority is positive on all three dimensions with the largest factor score on the Potency dimension. Conflict, on the other hand, is negative on Evaluation but positive on Potency and Activity. In this manner a balanced and well distributed set of concepts can be selected which represent the eight possible Evaluation, Potency, and Activity combinations (+++, ++-, +--, +--, -++, --+, -+-, ---).

No attempt was made in the present study to meet this criterion of representativeness. A relevant and representative sample of management concepts could not be found in available dictionaries. Furthermore, it seemed unreasonable to the writer to superimpose the Evaluation, Potency, and Activity structure on a research design seeking to find its own dimensions of meaning. If concepts are selected because of their known loadings on the EPA dimensions then the subsequent finding that concepts fall on those dimensions seems to be an artifactual result. Furthermore, a secondary objective of this research was to see if the EPA structure does, in fact, emerge from an independently chosen set of concepts and scales.

Eleven of the sixty-one concepts used in this study appear in the Semantic Atlas for 550 Concepts (7, 625). These eleven are: authority, business, conflict, freedom, leader, love, politics, power, psychology, success and work. The ratings found in this study are consistent with the published ratings with two exceptions: psychology and conflict. Psychology has a $-.325$ Activity score whereas in the present study psychology has a $+.483$ Activity score for students and a $+.375$ for managers.

Conflict has a -1.106 Evaluative factor score in the Atlas but a +.540 score for managers in this study and a -.310 for students. In the final analysis, if representativeness means that the concepts need to be chosen from all three dimensions of semantic space, the concepts in this study are not representative.

Concept selection procedure. In order to obtain concepts for use in this study several sources were used: students, managers, management texts, and the interest of the author to include certain concepts because "they might be interesting." Concepts were obtained from students and managers in the following manner: The resposdee's were asked to write down the first thing that comes to their minds when they think of the word "management." In addition, they were asked the following questions: Who do you think of? What book do you think of? What periodicals do you think of? What problem do you think of? and What school do you think of? The responses from this effort were tabulated and, after eliminating many that did not seem to fit into the study, the result was a list of concepts that could be said to have been solicited from people similar to those that would be used in the final study.

The indexes of several management texts were screened for words that appeared most frequently (examples: span of control, organizational structure, planning, motivation, authority, responsibility, and control). Finally, some concepts were included because of certain interests of the author. For example, the following value-type words were included because of the desire to relate this research to other research on the values of managers: science, religion, economics, politics, theory, freedom, and love. In addition, words representing certain functional areas of business were included (some were also mentioned by the students and managers): marketing, production, and accounting. Finally, certain words were included because this study was

designed to compare college students and professors with managers in real organizations. Thus, college student, college professor, business education, psychology, and mathematics were included.

The final result of this process was a list of sixty-one nouns that were used in qualifier elicitation. A complete list of the sixty-one concepts is contained in Table I. For purposes of this study these sixty-one concepts make up the management content domain.

Critique of concept selection. The selection of concepts for this study could have followed more systematic procedures. For example, after a large number of concepts had been selected in the manner described they could have been ranked by a group of managers and/or students. Perhaps a Q-sort could have been used. The benefit of some sort of ranking would have been two-fold: the number of concepts could have been more systematically reduced to around forty or fifty and there would be greater assurance that the concepts chosen were the most important concepts to managers and students in specifying the management domain. Such a procedure probably would have eliminated concepts like art, religion, love, theory, and freedom. These were included because of special interests of the writer. The sixty-one concepts listed in Table I appear to the writer to be a useful set of concepts for defining the management area.

Scale Selection

A "scale" in a SD study is a pair of bipolar adjectives separated (in this study and in most SD studies) by seven intervals allowing the subject to respond with varying degrees of intensity. The process of choosing scales is much more structured than that of choosing concepts. Assuming

TABLE I

CONCEPTS USED IN SEMANTIC DIFFERENTIAL STUDY OF THE
MEANING OF MANAGEMENT

1. BUSINESSMAN	31. AUTHORITY
2. SPAN OF CONTROL	32. RESPONSIBILITY
3. PROFIT	33. OPPORTUNITY
4. EXECUTIVE SALARIES	34. SCHEDULES
5. INFLUENCE	35. SUCCESS
6. SMALL BUSINESS	36. ACHIEVEMENT
7. COSTS	37. PRACTICAL EXPERIENCE
8. DECISION-MAKING	38. FREE ENTERPRISE
9. EFFICIENCY	39. LEADERSHIP
10. ORGANIZATIONAL STRUCTURE	40. BUDGETS
11. WORK	41. SCIENCE
12. ORGANIZATIONAL GOALS	42. RELIGION
13. QUALITY	43. ECONOMICS
14. COMPETITION	44. POLITICS
15. POWER	45. THEORY
16. COMMITTEES	46. FREEDOM
17. PLANNING	47. LOVE
18. MOTIVATION	48. ART
19. CONFLICT	49. PRODUCTION
20. BIG BUSINESS	50. MONEY
21. PRIVATE PROPERTY	51. LABOR UNIONS
22. COMMUNICATION	52. ACCOUNTING
23. HUMAN BEING	53. GENERAL MOTORS
24. TIME	54. PSYCHOLOGY
25. EXECUTIVE	55. COLLEGE PROFESSOR
26. CONTROL	56. COLLEGE STUDENT
27. CHAIN OF COMMAND	57. BUSINESS EDUCATION
28. MORALE	58. COMPUTERS
29. BUSINESS	59. IBM
30. ORGANIZATION	60. MATHEMATICS
	61. MARKETING

semantic space to be multi-dimensional the ideal situation would be to have one scale represent each dimension, that scale being perfectly aligned with its dimension and perfectly reliable. In practice, specific scales are neither perfectly aligned nor perfectly reliable. Therefore, a small set of scales is used to represent each dimension or factor, and a factor score is obtained by the average of the scales. This average or factor score is assumed to be more representative and more reliable than scores on individual scales.

Guides for selecting scales. There are several criteria to consider in selecting scales for a SD study: (1) relevance to the concepts being judged, (2) factorial composition, (3) semantic stability, and (4) linearity. The relevance criterion was met in this study by means of the procedure used in selecting scales -scales were gathered from subjects similar to those who participated in the study. The total set of 49 scales finally used could be said to be relevant to the management content domain. However, not all 49 scales were equally relevant to each of the sixty-one concepts.

The factorial composition criterion requires that scales representing all EPA dimensions be used (5, 238). The 49 scales used in this research does include scales representing all three dimensions but the scales were not chosen because of that. Rather, the procedure followed in scale selection simply resulted in scales representing EPA and other possible dimensions.

The semantic stability criterion has to do with possible variation in factorial composition because of changes in the set of concepts being rated. For example, the words HOT and COLD are used connotatively in rating many concepts (like PEOPLE) but may be used denotatively in rating physical objects. Since the scale takes on different meanings with different concepts,

its factorial composition may be different for the special class of objects (5, 239). The best assurance of semantic stability comes from carrying out new factor analyses for specific content areas. That has been done in this study. Nevertheless, specific scales may be used in different ways by different subjects. For example, the black-white scale used in this study may have a variety of meanings depending upon the subject.

Finally, the linearity criterion has to do with the question of whether the bipolar adjectives are true linguistic contrasts. It is assumed in SD work that true linguistic contrasts provide a means for making up scales which define basic affective contrasts. That is, it is assumed that two contrasting adjectives plotted in the SD space would be about equidistant from the neutral center point and they also would be opposite one another so that a line passing between them would pass through the center. This research assumes that the linearity or bipolarity assumption has been met. There is some evidence that the assumption may not always be warranted (1). For example, the hard-soft scale appears not to meet the bipolarity assumption. Further, the bipolarity assumption may be more valid for Evaluative scales than for Potency and Activity scales. Nevertheless, Heise (4, 407) concludes that "On the whole, the bipolarity assumption is probably justified for most scales used in SD research." The present research makes no test of the assumption.

Scale selection procedure. Standard lists of scales for SD research are available (8, 43), however, the best procedure for studying a specific content domain is to develop scales appropriate to that domain. It undoubtedly will turn out that many of the scales so developed will be

identical with standard scales, however, that assumption was not made in this study.

Each subject was given a set of twenty cards. Each card had keypunched on it one of the sixty-one concept words. The cards were randomized so that the same twenty words did not always appear together. Ninety students and professors were asked to write after each word as many adjectives as come most quickly to mind when seeing the word on the card. Eighty managers (thirty sales managers, twenty manufacturing managers, and thirty participants in the Summer 1970 University of Illinois Executive Development Program) were asked to perform the same task. The qualifier elicitation procedure resulted in 5,734 responses from the students/professors and 6,124 responses from the managers for a total of 11,858 responses. These figures represent total number of responses but not different responses. For example, if "necessary" was mentioned 136 times it would count as 136 responses. There were 2,674 different responses from the students/professors and 2,559 different responses from the managers. To illustrate, the different responses given to the word PROFIT are shown in Table II.

An examination of the words found in Table II indicates that the majority of responses given are not adjectives. Since the SD uses adjectives for anchors on a bipolar scale, most of the above responses will not end up as qualifiers for use in the study. Lists such as the one shown in Table II are available for all sixty-one concepts and are of some interest. For example, it is interesting to note the much larger number of words given by the managers compared to that given by the students/professors even though fewer managers than students/professors responded to PROFIT. In addition,

TABLE II

RESPONSES GIVEN TO THE WORD 'PROFIT'
BY MANAGERS AND STUDENTS/PROFESSORS

Managers

Advance, Bonus, Budget, Build, Business, Capitalism, Communications, Compensation, Consistent, Corporation, Desirable, Divided, Dollars, Earned, Earnings, Effected, Efficiency, End Result, Ethical, Expansion, Expenses, Experience, Factor, Fair, Gaining, Gains, Good, Grow, Growth, Hard to Get, High, Ideals, Important, Increase, Intelligence, Investment, Just, Large, Learning, Living, Loss, Lost, Low, Misunderstood, Money, Moral, Motive, Necessary, Needed, Net, New Products, Objective, Over-stressed, Paper, Pooled, Prime, Reason, Reasonable, Reinvest, Report, Return, Reward, Salaries, Sales, Satisfaction, Stockholder, Survival, Tax, Top Priority, Ultimate, and Variance (71 words).

Students/
Professors

Accounting, Anti-social, Business, Competition, Economic, Efficiency, Enough, Excellent, Exploitative, Fair, Gain, GM, Goal, Good, Gross, High, Important, Income, Large, Loss, Low, Margin, Maximum, Misunderstood, Money, Motivation, Necessary, Net, Normal, Optimum, Output, Performance, Reporting, Reward, Sales, Self-centered, Small, Stimulating, and Success (42 words).

there are more negative responses (anti-social, enough, exploitative, and self-centered) in the student/professor list than in the manager list.

Such observations, however, are difficult to evaluate.

The 5,734 student/professor responses and the 6,124 manager responses were punched onto IBM cards along with their appropriate concept stimuli. A typical card contained a number (one through 61) and a response. The responses from both groups were analyzed separately and together according to frequency, diversity, and independence. Frequency refers to the number of times a specific response appears. Diversity refers to the number of different concepts with which a particular response is associated.

Frequency and diversity are combined into a single H-value which is equivalent to the information theory measure H. Responses mentioned for only one concept have unit frequency and diversity and have an H value of zero. Responses mentioned for several concepts have H values greater than zero with the size of H determined by the frequency and the diversity. For example, in the student/professor group, "necessary" was used 99 times on 46 different concepts for an H rank of 1 and an H value of .09064. In the manager group, "necessary" was used 136 times on 49 concepts for an H-rank of 1 and an H-value of .11685. "Good" ranked second in both groups. Table III summarizes the H-values for both groups and Table IV lists the top fifteen H-values in each of the groups.

After the H-values were computed the phi coefficient statistic was employed to reduce semantic redundancy and maximize independence among the qualifiers. For example, if a response such as "good" is highly correlated with "necessary" but necessary has a higher H-value, then good is eliminated and necessary is retained. The phi measure was made for each response against every other response having a higher H-value in the H-ranked lists for Managers and for Students/Professors. The responses which had low phi-

TABLE III

H-VALUES ABOVE AND BELOW ZERO - MANAGERIAL AND
STUDENT/PROFESSOR GROUPS

	<u>Managers</u>		<u>Students/Professors</u>	
	<u>Amount</u>	<u>Percent</u>	<u>Amount</u>	<u>Percent</u>
H-Value = Zero	1,797	70	1,979	74
H-Value Greater Than Zero	<u>762</u>	<u>30</u>	<u>695</u>	<u>26</u>
	2,559	100%	2,674	100%
Number of Responses Named Ten or more times	82	3	70	3

TABLE IV

TOP FIFTEEN H-VALUES - MANAGERIAL AND
STUDENT/PROFESSOR GROUPS

<u>Managerial Group</u>			<u>Student/Professor Group</u>		
<u>H-Rank</u>	<u>Qualifier</u>	<u>H-Value</u>	<u>H-Rank</u>	<u>Qualifier</u>	<u>H-Value</u>
1	Necessary (136,49)	.11685	1	Necessary (99,46)	.09064
2	Good (81,41)	.06790	2	Good (81,34)	.06742
3	Business (62,30)	.04692	3	Important (60,35)	.05074
4	Important (58,36)	.04690	4	Efficient (64,27)	.04905
5	Difficult (34,21)	.02321	5	Money (42,21)	.03051
6	Leader (41,14)	.02167	6	Powerful (43,19)	.03007
7	Money (39,13)	.02124	7	Business (32,21)	.02377
8	Management (28,19)	.01883	8	Conservative (40,17)	.02310
9	Intelligent (31,14)	.01787	9	Control (30,17)	.02001
10	Interesting (28,15)	.01662	10	Useful (28,17)	.01913
11	Power (30,13)	.01656	11	Interesting (28,16)	.01837
12	Efficient (25,17)	.01593	12	High (33,12)	.01744
13	Personal (26,15)	.01562	13	Power (28,14)	.01647
14	Profit (26,14)	.01549	14	Work (21,16)	.01406
15	Useful (25,16)	.01548	15	Executive (21,15)	.01362

NOTE: Numbers in parentheses - First number is frequency of response; second number is diversity of response.

coefficients (.390 for Managers and .390 for Students/Professors) but high H-values were finally selected. This procedure yielded 26 qualifiers from the Manager group and 43 from the Student/Professor group. An additional 24 qualifiers were obtained by applying the H-value - phi-coefficient (phi = .340) analysis to the Manager group and the Student/Professor group combined. Thus, a list of 93 qualifiers to be used for opposite solicitation resulted from the original lists of 11,858 responses.

The next step in the scale-selection procedure was to elicit opposites for the ninety-three qualifiers. Only students were used in this procedure. It was felt that, given one of the qualifiers, students, professors, and managers would not be likely to give different words as opposites. An Opposite Solicitation Form was used to elicit opposites and was administered to a sample of twenty students. The students were asked to respond with an opposite that occurs readily to them. This procedure resulted in some words receiving a clear majority of one opposite (poor, necessary, important, slow, quiet), some words that had no clear opposite (influential, essential, dedicated, changing), and some words that were in the middle (big, huge, fun enjoyable). The latter group of qualifiers were used in a forced-choice procedure with another group of students in a further attempt to elicit opposites. For example, given the word "fun" the students were asked to choose between boring, dull, and work. The latter three words were the most frequently used in the initial opposite solicitation procedure. If this procedure resulted in a qualifier receiving a clear majority of one opposite, it was accepted for use in the study.

Both of these opposite elicitation procedures yielded a final list of 49 bipolar scales.

The 49 scales were randomized and then the polarity direction of the pairs was also randomized. Thus, positive words like good, desirable, right could be located on either end of the bipolar scale. The question of whether to randomly alternate the polarities of scales is given some attention by Nunnally (7, 542). He notes that the purpose of such reversals of polarity is to prevent subjects from being influenced from scale to scale by ratings made on previous scales. However, such practice may increase measurement error and Nunnally concludes, "The weight of the argument is for keeping the scales pertaining to any factor all pointing in the same direction." Nevertheless, this research randomized the scales because it was judged that, with 49 scales to rate per concept and with several concepts, the respondent would be more careful in marking the scales if they were randomized.

The same ordering of scales and polarity direction was retained throughout this study. Table V shows the ordering and polarity direction of scales along with the seven-interval scale which allows the respondent to respond in varying degrees of intensity depending on how he feels toward a particular concept. This research, then, is a study of 49 bipolar scales set against 61 management concepts.

Sample and Administration

Once the 61 concepts and the 49 bipolar scales were selected they were administered to two samples. The Student sample consisted of 399 University of Illinois Commerce College and Graduate College students. The make-up of the student sample was as follows: 347 College of Commerce Juniors and Seniors, 24 Master of Business Administration candidates, and 28 Master

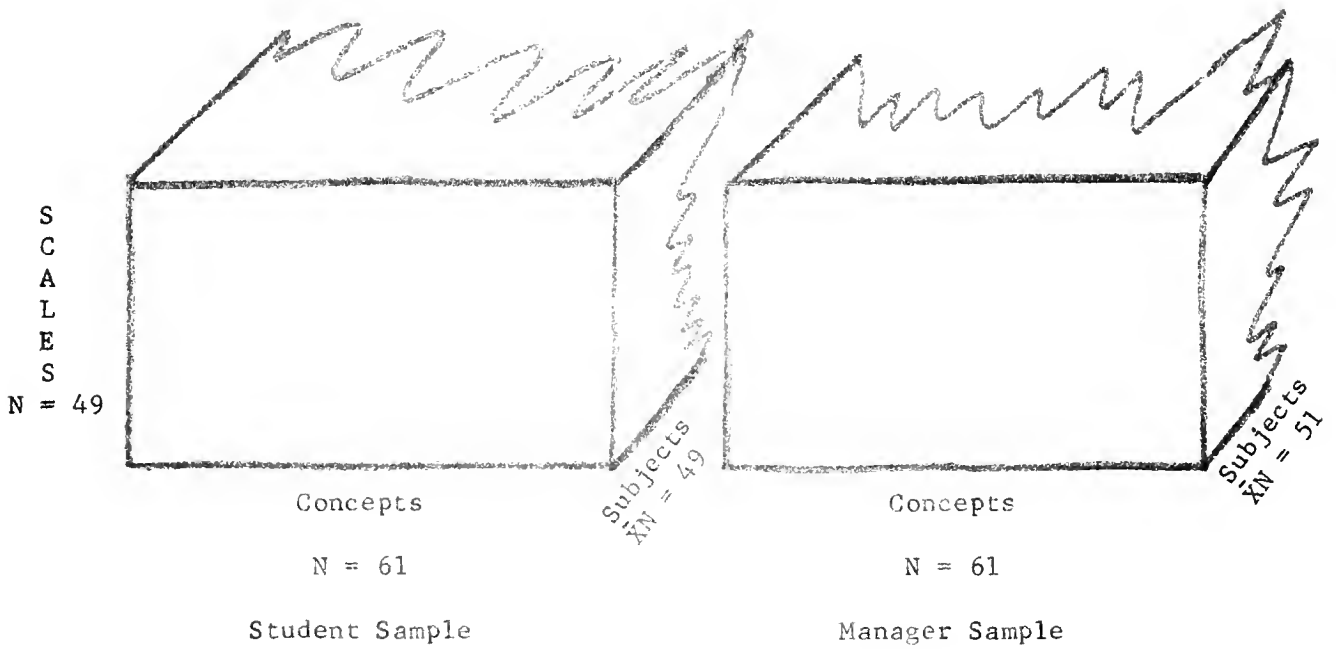
of Accounting Science candidates. The Managerial Sample consisted of 464 managers: 62 managers in an electronics manufacturing plant, 11 plant managers, 198 administrators of building codes, 12 staff managers (accountants, personnel managers, etc.), 72 civilian and military supervisors at a United States Air Force Base, and 109 store and produce managers of a supermarket chain. The scales were administered to both groups between December 1970 and March 1971.

All 49 scales were used to judge each of the 61 concepts, thus, a complete set of responses consisted of 2,989 (61×49) judgments. Since that many judgments is clearly too many to require of a single subject, the task was divided so that each subject responded to ten or fewer concepts. As a result of this procedure, the number of subject's responding to the concepts differed with each concept. For example, 64 students responded to the 49 scales on the concept ORGANIZATION whereas only 20 students responded to MATHEMATICS. The mean number of students responding to each concept was 49 and the range was 20 to 126. The mean number of managers responding to each concept was 51 with a range of 9 to 83. Twelve concepts had fewer than thirty respondents.

It may be helpful to illustrate the combination of scales, concepts, and subjects by means of a data "cube." As indicated in Figure A, a data "cube" does not literally exist because of the varying sample size per concept.

Packets containing between four and ten SD forms were administered. In this case a SD form is 49 scales set against one of the 61 concepts. Instructions for completing the forms were provided with each packet and were as suggested by Osgood (8, 84-85). See Appendix C for sample instructions.

Figure A. Schematic showing relationship of concepts, scales, and subjects in managerial group and student group.



The subjects were instructed to think of the concepts shown at the top of each page in general terms. That is, they were specifically requested not to relate the concept to a particular person, position, or situation, but to think of the concept as an abstraction. The subjects were asked to place one and only one check mark (✓) for each bipolar scale under each concept. In addition, the instructions were explained and the manner of completing the forms was illustrated.

The great majority of subjects completed the task in one half hour or less. All subjects completed the task within forty-five minutes. The most judgments made by any subject was 490 (1 subject X 10 concepts X 49 scales), and the least number of judgments was 196 (1 subject X 4 concepts X 49 scales). All together, 3,113 judgments were obtained from the managerial group and 3,089 judgments from the student group.

Factor Analysis of Scales

An enormous amount of data is generated from a semantic differential study such as the one reported on here. Many types of analysis can be applied to the data. The analysis reported here is concerned with the factor analysis of scales across concepts.

Frequency distributions and means by concept. For each of the 61 concepts a frequency distribution was prepared of the number of responses placed in each of the seven positions on a scale. This was done for all 49 scales so each of the concepts yielded 49 frequency distributions. Scale means and variances were also computed across subjects for each concept. For example, for the concept BUSINESSMAN the mean on scale 1 (structured-unstructured) was 2.833 and the variance was 1.155 for the student group and 2.192 and .925, respectively, for the managerial group. In scoring

the scales, the left most position on the seven position scale was always given a value of 1 and the right most position a value of 7. This procedure was followed regardless of the polarity direction of the bipolar scales. Thus, "extremely good" might have a value of 7 while "extremely desirable" might have a value of 1. Scoring was as follows:

			Neither One Nor			
Extremely	Quite	Slightly	The Other	Slightly	Quite	Extremely
<u>1</u> :	<u>2</u> :	<u>3</u> :	<u>4</u> :	<u>5</u> :	<u>6</u> :	<u>7</u> :

This procedure was followed to ease the burden of the keypunching task and because mean values were not the primary focus of this study. The main purpose of this phase of the research was to obtain from the 49 scales a factor structure that would enable a smaller number of scales to be used. Furthermore, scale reversal computer programs make it possible to change the weight assigned to a response from 1 to 7, 2 to 6, 3 to 5, with the weight of 4 remaining the same.

Correlations, principal components analysis, and varimax rotation. The scale means described above were summed across concepts and a mean of means was computed. For example, for scale 1 (structured-unstructured) there was a mean for each of the 61 concepts. These 61 means were summed and a mean of means for scale 1 was computed. This was done for each of the 49 scales. This averaging procedure is commonly used in analyzing semantic differential data when the researcher is interested in group measurements rather than individual measurements. These means served as the input for the correlation matrix, and the matrix was subjected to a principal components analysis (2)(10). Each successive factor extracted accounts for the maximum

possible share of the total variance in the correlation matrix. Table VI shows the first nine factors and the percent variance accounted for by each.

An examination of the factor loadings on the nine factors revealed a great similarity between the manager and the student factor structures. That is, it did not appear that an analysis of the managerial data would yield a factor structure different from that of the students. In order to measure the similarity of the two factor structures, coefficients of congruence (2) were computed using six factors. The results are shown in Table VII.

Table VII indicates that Factor I of both groups is practically identical ($CC = .97$), Factor II of the student group is similar to Factor III of the managerial group ($CC = -.90$), Factor IV of both groups are similar ($CC = .73$), and Factors V and VI are difficult to interpret.

On the basis of this analysis the manager group and the student group were combined and subjected to a principal components analysis. Table VIII shows the first nine factors and the percent variance accounted for by each factor.

TABLE VI

ROOTS AND PERCENT VARIANCE ACCOUNTED FOR BY FIRST NINE PRINCIPAL
COMPONENTS FACTORS IN SEMANTIC DIFFERENTIAL STUDY OF THE MEANING
OF MANAGEMENT: BY GROUPS

Factor	Group					
	Manager			Student		
	Root	Percent Variance	Cumulative %Variance	Root	Percent Variance	Cumulative %Variance
1	18.9421	38.66	38.66	16.3607	33.39	33.39
2	6.0276	12.30	50.96	7.8188	15.96	49.35
3	4.1901	8.55	59.51	5.6648	11.56	60.91
4	2.9041	5.93	65.44	3.4021	6.94	67.85
5	2.2297	4.55	69.99	2.2657	4.62	72.47
6	1.7795	3.63	73.62	2.1014	4.29	76.76
7	1.7343	3.54	77.16	1.6468	3.36	80.12
8	1.4291	2.92	80.08	1.1698	2.39	82.51
9	1.0218	2.08	82.16	1.0215	2.08	84.59
10 - 49	8.7417	17.84	100.00	7.5484	15.41	100.00

NOTE: Factors 10-49 had roots less than 1.00. Roots less than 1.00 are usually considered to be error variance.

TABLE VII

COEFFICIENTS OF CONGRUENCE BETWEEN FIRST SIX PRINCIPAL COMPONENTSFACTORS, STUDENT GROUP, AND FIRST SIX PRINCIPAL COMPONENTSFACTORS, MANAGERIAL GROUP

<u>Factor</u>	<u>Factor</u>					
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
1	.97	-.10	-.04	.32	.36	-.27
2	.28	.07	-.90	.35	-.05	-.33
3	.06	-.90	.11	.23	.19	.30
4	.03	-.44	.27	.73	.12	.05
5	-.03	-.35	.37	-.09	.48	.18
6	-.41	.20	-.06	.00	-.44	.55

TABLE VIII

ROOTS AND PERCENT VARIANCE ACCOUNTED FOR BY FIRST NINE PRINCIPAL
COMPONENTS FACTORS IN SEMANTIC DIFFERENTIAL STUDY OF THE
MEANING OF MANAGEMENT: COMBINED
MANAGERIAL AND STUDENT GROUP

<u>Factor</u>	<u>Root</u>	<u>Percent Variance</u>	<u>Cumulative Percent Variance</u>
1	18.40	37.56	37.56
2	7.71	15.73	53.29
3	5.56	11.14	64.43
4	3.09	6.32	70.75
5	2.13	4.34	75.09
6	1.94	3.95	79.04
7	1.71	3.48	82.52
8	1.13	2.30	84.82
9	.96	1.95	86.77
10 - 49	6.37	13.23	100.00

The first six principal components factors were rotated orthogonally using the varimax criterion (5) (10). This procedure redistributes the principal components factor matrix variance so that the matrix approaches orthogonal simple structure. The rotated factor matrix is shown in Table IX.

TABLE IX

ORTHOGONALLY ROTATED PRINCIPAL COMPONENTS FACTORS ON 49 SCALESACROSS 61 CONCEPTS: COMBINED MANAGER AND STUDENT GROUP

	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	<u>VI</u>	<u>h²</u>
1. Structured-Unstructured	-.20	-.81	-.30	-.10	.04	.12	.81
2. Wrong-Right	.85	-.24	-.03	-.15	-.09	.05	.82
3. Little-Big	.07	.11	.91	-.16	-.05	.10	.88
4. Impractical-Practical	.87	.28	.16	-.02	.14	-.04	.89
5. Ambitious-Lazy	-.31	-.05	-.25	.79	-.14	.10	.82
6. Mental-Physical	-.16	.24	.05	-.10	.13	.71	.62
7. Best-Worst	-.83	.22	.04	.34	.06	-.07	.86
8. Desirable-Undesirable	-.89	.28	.02	.11	.04	-.05	.88
9. Biased-Unbiased	.63	-.03	-.07	.43	.32	-.29	.78
10. Valuable-Worthless	-.93	.08	-.09	-.01	-.08	-.06	.89
11. Black-White	.14	-.13	-.33	-.58	-.22	-.11	.54
12. Slow-Fast	.14	.17	.24	-.07	.79	.02	.74
13. Unethical-Ethical	.82	-.26	-.24	.03	-.24	-.16	.88
14. Reasonable-Unreasonable	-.90	.09	.14	-.04	-.03	.22	.88
15. Friendly-Unfriendly	-.44	.62	.30	.20	.22	-.10	.77
16. Illogical-Logical	.83	.24	.10	.06	.22	-.32	.92
17. Unreliable-Reliable	.76	.25	.05	.18	.19	-.30	.81
18. Honest-Dishonest	-.80	.32	.19	-.05	.12	.16	.82
19. Dull-Exciting	.35	-.57	.17	-.53	.24	.06	.82
20. Quantitative-Qualitative	.21	-.51	-.33	-.19	-.46	-.27	.73
21. Unproductive-Productive	.75	.05	.38	-.18	.35	.02	.87
22. Rich-Poor	-.05	-.13	-.58	.50	.06	-.27	.69
23. Inefficient-Efficient	.80	.30	.18	-.00	.33	-.13	.89
24. Easy-Difficult	.22	.06	.18	-.35	.20	-.51	.51
25. Effective-Ineffective	-.79	-.22	-.32	.08	-.19	-.06	.82
26. Free-Restricted	-.04	.91	-.09	.17	.03	.13	.88
27. Tiny-Huge	-.04	.05	.95	-.08	-.09	.09	.92
28. Unlimited-Limited	-.08	.63	-.63	-.11	-.07	.19	.86
29. Rewarding-Unrewarding	-.74	.46	-.11	.28	-.04	-.07	.85
30. Realistic-Unrealistic	-.85	-.11	-.07	.09	-.26	.05	.82
31. Short-sighted-Far-sighted	.63	-.03	.31	-.07	.00	-.41	.68
32. Wide-Narrow	.35	.31	-.74	.12	-.07	.15	.81
33. Unimportant-Important	.82	-.02	.27	-.12	.02	.12	.78
34. Hard-Soft	-.12	-.56	-.33	.37	-.24	.34	.74
35. Complex-Simple	.02	.04	-.70	.03	-.24	.40	.70

TABLE IX
(Continued)

	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	<u>VI</u>	<u>h²</u>
36. Rational-Irrational	-.77	-.23	-.02	-.01	.23	.39	.86
37. Passive-Active	.11	-.05	.21	-.86	.07	.08	.81
38. Responsible-Irresponsible	-.79	-.08	.21	.27	-.18	.27	.86
39. Young-Old	-.12	.23	.30	.04	-.70	.08	.66
40. Selfish-Generous	.55	-.55	-.06	.37	-.26	-.02	.81
41. Quiet-Loud	-.55	.28	.35	-.48	.07	-.07	.75
42. Fair-Unfair	-.83	.22	.29	.06	.11	.16	.85
43. Independent-Dependent	.14	.32	-.06	.36	.04	.16	.28
44. Heavy-Light	.06	-.49	-.63	.16	-.11	.14	.70
45. Boring-Interesting	.48	-.65	.13	-.41	.18	-.02	.87
46. Unnecessary-Necessary	.89	.01	.14	-.08	.01	.04	.82
47. Unqualified-Qualified	.65	.28	-.13	-.22	-.02	-.45	.76
48. Bad-Good	.88	-.34	-.02	-.11	-.10	-.02	.91
49. Tight-Loose	-.14	-.85	.05	.24	.01	-.13	.83
Percent of Common Variance	45	17	14	11	7	6	
Cumulative	45	62	76	87	94	100	
Percent of Total Variance	36	13	12	8	5	5	
Cumulative	36	49	61	69	74	79	

Interpretation. Factor I accounts for 44.89 percent of the common variance and is clearly an evaluative factor. It contains two scales, valuable-worthless and bad-good that are commonly found on the Evaluative factor in SD research. The highest loading scales are valuable-worthless (-.93), reasonable-unreasonable (-.90), desirable-undesirable (-.89), unnecessary-necessary (.89), and bad-good (.88). Other scales with loadings on Factor I of .80 or more are right-wrong, impractical-practical, best-worst, unethical-ethical, illogical-logical, honest-dishonest, inefficient-efficient, realistic-unrealistic, unimportant-important, and fair-unfair. Honest-dishonest and fair-unfair are common Evaluative scales. Factor I will be named Evaluation.

Factor II accounts for 16.90 percent of the common variance. Its highest loading scales are free-restricted (.91), tight-loose (-.85), structured-unstructured (-.81), boring-interesting (-.65), and unlimited-unlimited (.63). These scales provide a means for describing the climate or atmosphere of management. Is the climate restricted, tight, structured, boring, and limited or is it the opposite of these. Friendly-unfriendly and dull-exciting are two other scales that load on Factor II. Factor II will be named Climate.

Factor III accounts for 14.56 percent of the common variance and is similar to Osgood's Potency factor. The highest loading scales on Factor III are tiny-huge (.95), little-big (.91), wide-narrow (-.74), complex-simple (-.70), and heavy-light (-.63). Factor IV, with 10.59 percent of the common variance is more difficult to interpret because it has only two good loadings. The highest loading scales on Factor IV are passive-active (-.86), ambitious-lazy (.79), black-white (-.58), dull-exciting (-.53), and rich-poor (.50). Although this factor has no clear

identity it is close enough to the Activity factor to give it that label. The black-white and rich-poor scales have shown up as Evaluative factors in other studies. Finally, Factors V and VI, accounting for 6.63 and 6.41 percent of the common variance, respectively, do not have enough high loading scales to interpret. Factor V has two high loading scales, slow-fast and young-old, which appear to be Activity scales but did not load heavily on the Activity factor in this study.

In sum, four factors account for 87 percent of the common variance and 69 percent of the total variance. Twenty scales with highest loadings on these four factors have been selected to represent the four factors or dimensions of meaning of management. These twenty scales are:

Factor I (Evaluation)

Valuable-worthless

Reasonable-unreasonable

Desirable-undesirable

Unnecessary-necessary

Bad-good

Factor II (Climate)

Free-restricted

Tight-loose

Structured-unstructured

Boring-interesting

Unlimited-limited

Factor III (Potency)

Tiny-huge

Little-big

Wide-narrow

Complex-simple

Heavy-light

Factor IV (Activity)

Passive-active

Ambitious-lazy

Black-white

Dull-exciting

Rich-poor

The above twenty adjective pairs with the usual seven-step rating scale will be called a Managerial Differential. Further analysis of the data

collected in this research will lead to modifications in the Managerial Differential. In addition, data already collected on the above twenty scales will provide some insight into how managers and students feel about management from the viewpoint of the above four dimensions. It is felt that the above managerial differential represents a first step in the construction of an instrument that will be useful in measuring the affective meaning of management.

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Appendix A
SAMPLE INSTRUCTIONS FOR COMPLETING SEMANTIC DIFFERENTIAL FORMS

UNIVERSITY OF ILLINOIS
Department of Business Administration

Pilot Study

Semantic Differential Study of the Meaning of Management

Robert Albanese

The purpose of this study is to measure the meanings of certain specific concepts relevant to the broad concept, "management".

The measurement is done by having various people judge specific concepts against a series of descriptive scales. On each of the following pages you will find a different concept to be judged and beneath it a set of scales. You are to rate the concept on each of these scales in order. Please make your judgments on the basis of what these things mean to you.

Here is how you are to use these scales:

If you feel that the concept at the top of the page is very closely related to one end of the scale, you should place your check-mark as follows:

fair X : _____ : _____ : _____ : _____ : _____ : _____ unfair

or

fair _____ : _____ : _____ : _____ : _____ : X _____ unfair

If you feel that the concept is quite closely related to one or the other end of the scale (but not extremely), you should place your check-mark as follows:

strong _____ : X : _____ : _____ : _____ : _____ : _____ weak

or

strong _____ : _____ : _____ : _____ : _____ : X : _____ weak

If the concept seems only slightly related to one side as opposed to the other side (but is not really neutral), then you should check as follows:

active _____ : _____ : X : _____ : _____ : _____ : _____ passive

or

active _____ : _____ : _____ : _____ : X : _____ : _____ passive

The direction toward which you check, of course, depends upon which of the two ends of the scale seem most characteristic of the thing you're judging.

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if you consider the concept to be neutral on the scale, both sides of the scale equally associated with the concept, or if the scale is completely irrelevant, unrelated to the concept, then you should place your check-mark in the middle space:

safe _____ : _____ : _____ : X : _____ : _____ : _____ dangerous

IMPORTANT: (1) Place your check-marks in the middle of spaces, not on the boundaries:

THIS NOT THIS

_____ : _____ : X : _____ X _____ :

- (2) Be sure you check every scale for every concept - do not omit any.
- (3) Never put more than one check-mark on a single scale.

Sometimes you may feel as though you've had the same item before on the test. This will not be the case, so do not look back and forth through the items. Do not try to remember how you checked similar items earlier in the test. Make each item a separate and independent judgment. Work at fairly high speed through this test. Do not worry, or puzzle over individual items. It is your first impressions, the immediate "feelings" about the items, that we want. On the other hand, please do not be careless, because we want your true impressions.





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