

SCALING OCCUPATIONAL FIELDS AND ENTERPRISES¹

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In evaluating job changes taking place in a person's career, it is common practice to note the continuity or lack of it revealed by the succession of positions held. One wants to know, usually, whether these jobs are a chaotic assortment or whether they reveal trends such as the development of specialized skills and the increase in responsibility which are associated with career development. When an attempt is made to extract meaning of this sort from job moves, one at once encounters the need to select dimensions by which to compare jobs and to describe changes.

In this project it was believed that use could be made of three dimensions of Level, Field, and Enterprise. Level and field were defined as in Roe (1956). In Roe's classification level is a hierarchy proceeding from the unskilled jobs at the lower end to the professional and managerial jobs at the top. This is a composite scale reflecting intelligence, education, responsibility, prestige, and income, the use of which as a scale is well established.

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²Marian Leibowitz was responsible for the analysis of frequency of job change reported in this paper, and contributed to the planning of the study.

Roe's second dimension consists of eight fields such as Service, Business Contact, and Technology, the distinguishing elements for the most part being the functions, interests, and skills associated with each of the eight areas.

The third dimension, enterprise, often called Industry, is the primary economic activity of the employing organization. The enterprise categories consist of the nine groupings of the U. S. Standard Industrial Classification. Illustrative groups are Mining, Construction, and Finance.

These three dimensions of field, level, and enterprise, it has been suggested (Super, 1957), permit the best description of a job, by defining degree of ability, type of function, and purpose for which these are put to work.

These dimensions were employed to classify jobs held by the subjects of the Career Pattern Study. Project staff members with a little orientation to the use of this three-dimensional scheme reached a fair level of agreement in classifying sample jobs. Interjudge percentage of agreement ranged from 60 to 75.

As a result, this appeared to be a meaningful and fairly reliable way to describe jobs. The next question was that of the use of this classification as a set of scales to express job changes numerically. Visualized at this point was something comparable to Sheldon's coding of somatotypes. The stable career such as that of a professional school graduate, the conventional career of a liberal arts graduate, and the multiple-trial career pattern made up of a haphazard sequence

of jobs such as characterizes many high school graduates, would thus have quite different codes. The need was to find a way to express these differences in stability or change of level, field, and enterprise numerically.

Two approaches to scaling job changes appeared possible. One was to have judges rate the amount of change involved in a sequence of two jobs. The other was to see how often people do in actuality move from one kind of job to another.

Accordingly, eight trained and experienced employment counselors were asked to rate, on a scale ranging from 1 to 5, the change involved when a person changed fields only, at the various levels of responsibility. They were then asked to rate changes in enterprise only, again at the several levels. To simplify the task somewhat, the six levels were grouped into three larger categories, the top, middle, and lower levels.

The sheets which have been distributed show the types of comparison made in constructing the rating scale, along with some mean values expressing the raters' decisions. An analysis of the dispersion of the ratings showed that raters agreed most often on field, in particular on changes involving middle level jobs. For the ratings to be usable, it was decided, the confidence interval for a set of ratings should not exceed 1.0 on either side of the obtained mean, based on the .05 level of confidence. By that standard, at the top level 95% of the ratings could be used, 96% at the middle level, and only 77% at the lower level. Ratings showed the belief that people at the highest and at the lowest levels can often move easily to another field, whereas

middle level workers, the semi-professional and skilled, find it difficult to transfer to a new field.

The dispersion in the enterprise ratings was greater than for field, although again the agreement of the raters was greatest for the changes involving middle level jobs. At the top level 60% of the ratings were usable, according to the standard described above; at the middle level, 90%; and at the lower level, 81%.

We now had a list of job changes, with a scale of amount of change between any two jobs. However, it had been evident from comments that raters had not always been able to differentiate between field and enterprise. Accordingly it seemed likely that the two scales were not distinct. To ascertain whether the two rating scales were in fact separate measures, a series of job changes made by Career Pattern Study subjects were scored for amount of change of field and of enterprise. A total of 56 persons had made recent changes in both field and enterprise. The correlation of field and enterprise changes was .41, significant at better than the .01 level. Field and enterprise ratings are clearly not distinct and separate. However the correlation of .41 does indicate a substantial amount of independent variance.

Assuming, then, that the two rating scales do in fact reflect amount of change in moving from one job to another, the next step was to apply them to the job moves made by Career Pattern Study subjects during the years since leaving high school. Theoretically, there should be a negative correlation between frequency of occurrence of a given type of job change and the rated degree of difficulty involved in making

these changes. A count of the actual job changes showed that 91 enterprise changes had been made by these subjects during the six-year period covered, as compared with 71 field changes. A correlation of .23 was found between actual frequency and rated difficulty of field changes, not significant as it was in the opposite direction from that hypothesized; inspection of enterprise changes indicated no trend or pattern in the relationship between the two sets of figures, confirmed by a non-significant correlation ($r = -.14, p > .05$).

In conclusion, the three-dimensional system employed is composed of so many ill-defined factors that the construction and use of rating scales based upon it is not warranted. This means that this attempt to quantify a career sequence can not be carried forward with the methods we had hoped to use.

However, a three-dimensional scheme for descriptive purposes and for job classification still seems desirable and practical. The Roe scale needs further refinement before it can be used in classifying a great variety of jobs; in particular, the distinction between field and enterprise needs sharpening. If this can be accomplished, it may then be possible to develop, either by ratings or by a frequency count based on a large number of work histories, a reliable and valid set of scales for measuring job changes. A set of scales such as that attempted in this exploratory study would greatly facilitate studies of career development and of occupational mobility.

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DEFINITIONS OF ENTERPRISE GROUPINGS

A. AGRICULTURE, FORESTRY, AND FISHERIES. Agricultural operations consist of the production of crops or plants, vines, and trees (excluding forestry operations); or the keeping, grazing, or feeding of livestock for animal products, animal increase, or value increase. Also included are agricultural services, animal husbandry services, and other operations such as hunting, trapping, and game propagation, when carried on as business enterprises. The classification of FORESTRY covers timber tracts, forest nurseries, reforestation, and the gathering of gums and barks, as well as other operations connected with forestry. Logging camps are classified in Division D, Manufacturing. The classification of FISHERIES covers commercial fishing, fish farms, and related services.

B. MINING. Mining includes the extraction of minerals occurring naturally: solids, such as coal and ores; liquids, such as crude petroleum; and gases, such as natural gas. Included are quarrying, well operation, milling (crushing, screening, washing, etc.), and other preparation needed to render the material marketable.

C. CONTRACT CONSTRUCTION. General building contractors are primarily engaged in the construction of dwellings, office buildings, stores, farm buildings, and other projects of a similar character. General contractors in fields other than buildings, often referred to as heavy construction contractors, are primarily engaged in the construction of highways, streets, bridges and tunnels, docks and piers, dams and water projects; sewage collection, treatment, and disposal facilities; and storm systems, air fields, and other heavy construction which involves either earth moving or the erection of structures and appurtenances, other than buildings. Special trade contractors are primarily engaged in specialized construction activities such as plumbing, painting, electrical work, and carpentry.

D. MANUFACTURING. The manufacturing division includes those establishments engaged in the mechanical or chemical transformation of inorganic or organic substances into new products, and usually described as plants, factories, or mills, which characteristically use power driven machines and materials handling equipment. Establishments engaged in assembling component parts of manufactured products are also considered manufacturing if the new product is neither a structure nor other fixed improvement. The materials processed by manufacturing establishments include products of agriculture, forestry, fishing, mining, and quarrying.

E. TRANSPORTATION, COMMUNICATION, ELECTRIC, GAS AND SANITARY SERVICES.

This division includes enterprises engaged in passenger and freight transportation by railway, highway, water, or air, or furnished services related to transportation; petroleum pipe line transportation; warehousing; telephone and telegraph communication services; radio broadcasting and television; and the supplying of electricity, gas, steam, water, or sanitary services. Industries assigned to this division are to a large extent regarded legally as having a semipublic character.

F. WHOLESALE AND RETAIL TRADE. The chief functions of establishments included in wholesale trade are selling goods to trading establishments, or to industrial, commercial, institutional, and professional users; and bringing buyer and seller together. In addition to selling, functions

Enterprise groupings (continued)

frequently performed by wholesale establishments include maintaining inventories of goods; extending credit; physically assembling, sorting, and grading goods in large lots; breaking bulk and redistribution in smaller lots; delivery; refrigeration; and various types of promotion, such as advertising and label designing. RETAIL TRADE includes establishments engaged in selling merchandise for personal, household, or farm consumption, and rendering services incidental to the sale of the goods.

G. FINANCE, INSURANCE, AND REAL ESTATE. Finance includes banks and trust companies, credit agencies other than banks, holding (but not predominantly operating) companies, other investment companies, brokers and dealers in securities and commodity contracts, and security and commodity exchanges. Insurance covers carriers of all types of insurance, and insurance agents and brokers. Real estate includes owners, lessors, lessees, buyers, sellers, agents, and developers of real estate.

H. SERVICES. This division includes establishments primarily engaged in rendering a wide variety of services to individuals and business establishments. Hotels and other lodging places; establishments providing personal, business, repair, and amusement services; medical, legal, engineering, and other professional services; educational institutions; nonprofit membership organizations; and other miscellaneous services are included.

I. GOVERNMENT. This division includes all Federal, State, local and international government activities, such as the legislative, judicial, and administrative functions, as well as government owned and operated business enterprises.

Adapted from The Standard Industrial Classification Manual, 1957, U.S. Government Printing Office

Definitions of Fields

- I. SERVICE. These occupations are primarily concerned with serving and attending to the personal tastes, needs, and welfare of other persons. Included are occupations in guidance, social work, domestic and protective services. The armed services are distributed in accordance with the location of the civilian counterparts, i.e., chiefly in Groups III, Organization, and IV, Technology; however, the serviceman whose primary job is analogous to that of the domestic protective services is placed here.
- II. BUSINESS CONTACT. These occupations are primarily concerned with the face-to-face sale of commodities, investments, real estate, and services. Also included are such occupations as demonstrator, auctioneer, and some kinds of agents. A distinction is made in sales occupations between those in which the job is personal persuasion, which belong here, and those in which the selling is routine, and the person-to-person relation relatively unimportant, which belong in the next Group.
- III. ORGANIZATION. These are the managerial and white collar jobs in business, industry, and government, the occupations concerned primarily with the organization and efficient functioning of commercial enterprises and of government activities.
- IV. TECHNOLOGY. This Group includes occupations concerned with the production, maintenance, and transportation of commodities and utilities. Here are occupations in engineering, crafts (including repair work), and the machine trades, as well as transportation and communication.
- V. OUTDOOR - NATURAL SCIENCE. This Group includes agricultural, fishery, forestry, mining, and kindred occupations: the occupations primarily concerned with the cultivation, preservation, and gathering of crops, of marine or inland water resources, of mineral resources, of forest products, and of other natural resources, and with animal husbandry.
- VI. SCIENCE. These are the occupations primarily concerned with scientific theory and its application under specified circumstances, other than technology.
- VII. GENERAL CULTURAL. These occupations are primarily concerned with the preservation and transmission of the general cultural heritage. The Group includes occupations in education, journalism, jurisprudence, the ministry, linguistics, and so on. All elementary and high school teachers are included in this Group. At higher levels teachers of science and art are placed in Groups VI and VIII.
- VIII. ARTS AND ENTERTAINMENT. These occupations include those primarily concerned with the use of special skills in the creative arts and in the field of entertainment. Both creators and performers are included.

Definitions of Levels

This classification is based upon degrees of responsibility, capacity, and skill, with the level of responsibility being considered primary. By level of responsibility is meant not only the number and difficulty of the decisions to be made, but also how many different kinds of problems must be decided.

- Level 1. PROFESSIONAL AND MANAGERIAL I: INDEPENDENT RESPONSIBILITY. Innovators and creators, top managerial and administrative people, professional persons having important independent responsibility. Criteria are:
- a. Important, independent, and varied responsibilities.
 - b. Policy-making.
 - c. Education: When high-level education is relevant it is at the doctoral level or the equivalent.
- Examples: Doctor, Judge, and Research Scientist.
- Level 2. PROFESSIONAL AND MANAGERIAL II: The distinction between this Level and Level 1 is primarily one of degree. Autonomy may be present but with narrower or less significant responsibilities than in Level 1. Criteria:
- a. Medium-level responsibilities, for self and others, both with regard to importance and variety.
 - b. Policy interpretation.
 - c. Education at or above the bachelor level, but below the doctorate or its equivalent.
- Examples: Social Worker, Broker, and Editor.
- Level 3. SEMI-PROFESSIONAL AND SMALL BUSINESS.
- a. Low-level responsibility for others.
 - b. Application of policy, or determination for self only.
 - c. Education: high school plus technical school or the equivalent.
- Examples: Registered Nurse, Real Estate Salesman, and Interior Decorator.
- Level 4. SKILLED. Occupations requiring apprenticeship or other special training and experience.
Examples: Policeman, Carpenter, and Medical Technician.
- Level 5. SEMI-SKILLED. Require some training and experience but markedly less than occupations in Level 4. Considerably less autonomy and initiative are permitted in these occupations.
Examples: Cook, Sales Clerk, and Truck Driver.
- Level 6. UNSKILLED. Require no special training or education and little more ability than is needed to follow simple directions and to engage in simple repetitive actions.
Examples: Watchman, Messenger Boy, and Carpenter's Helper.

Adapted from Roe, The Psychology of Occupations

(Sample sheet)

FORM FOR RATING CHANGE IN ENTERPRISE

<u>Change From</u>	<u>Change To</u>	1 very slight change	2 some change, clearly noticeable	3 moderate change	4 sizeable change	5 great change
<u>Levels 1 and 2</u>						
A. Agric., forestry & field (Agric. Engineer, Forester, etc.)	B. Mining	_____	_____	_____	_____	_____
"	C. Construction	_____	_____	_____	_____	_____
"	D. Manufacturing	_____	_____	_____	_____	_____
"	E. Transp., Com- munication, Gas, etc.	_____	_____	_____	_____	_____
"	F. Wholesale & Re- tail Trade	_____	_____	_____	_____	_____
"	G. Finance, Ins., & Real Estate	_____	_____	_____	_____	_____
"	H. Services	_____	_____	_____	_____	_____
"	I. Government	_____	_____	_____	_____	_____
B. Mining	A. Agric., forestry & field	_____	_____	_____	_____	_____
C. Constr.	"	_____	_____	_____	_____	_____
D. Manuf.	"	_____	_____	_____	_____	_____
E. Transp.	"	_____	_____	_____	_____	_____
F. Wholesale...	"	_____	_____	_____	_____	_____
G. Finance...	"	_____	_____	_____	_____	_____
H. Services...	"	_____	_____	_____	_____	_____
I. Government	"	_____	_____	_____	_____	_____

(Sample sheet)

FORM FOR RATING CHANGES IN FIELD

<u>Change From</u>	<u>Change To</u>	1 very slight change	2 some change, clearly noticeable	3 moderate change	4 sizeable change	5 great change
<u>Levels 1 and 2</u>						
I Service	II Business Contact	_____	_____	_____	_____	_____
"	III Business Organization	_____	_____	_____	_____	_____
"	IV Technology	_____	_____	_____	_____	_____
"	V Outdoor-Natural Science	_____	_____	_____	_____	_____
"	VI Science	_____	_____	_____	_____	_____
"	VII General Cultural	_____	_____	_____	_____	_____
"	VIII Arts and Entertainment	_____	_____	_____	_____	_____
II Business Contact	I Service	_____	_____	_____	_____	_____
III Business Organization	"	_____	_____	_____	_____	_____
IV Technology	"	_____	_____	_____	_____	_____
V Outdoor- Natural Science	"	_____	_____	_____	_____	_____
VI Science	"	_____	_____	_____	_____	_____
VII General Cultural	"	_____	_____	_____	_____	_____
VIII Arts and Entertainment	"	_____	_____	_____	_____	_____

(Sample sheet)

RESULTS OF RATING CHANGES IN ENTERPRISE
on a scale ranging from 1 to 5

<u>Change from:</u>	<u>Change to:</u>	<u>Mean rating</u>	<u>Standard deviation of rating</u>	<u>Confidence Interval containing true mean at .05 level. Obtained mean plus or minus:</u>
<u>Levels 1 and 2</u>				
A. Agric. forestry & field (Agric. engineer, forester, etc.)	B. Mining	2.9	1.24	1.03
"	C. Construction	2.9	1.36	1.13
"	D. Manufacturing	3.5	1.31	1.09
"	E. Transp., Communication, Gas	3.4	1.30	1.08
"	F. Wholesale & Retail Trade	3.5	1.20	1.00
"	G. Finance, Ins., & Real Estate	4.1	1.32	1.10
"	H. Services	3.5	1.41	1.18
"	I. Government	3.0	1.51	1.26
B. Mining	A. Agric., forestry & field	2.9	1.24	1.03
C. Construction	"	2.9	1.36	1.13
D. Manufacturing	"	3.8	.89	.74
E. Transportation	"	3.6	1.19	.99
F. Wholesale...	"	3.8	1.02	.85
G. Finance...	"	4.0	.93	.78
H. Services...	"	3.6	1.41	1.18
I. Government	"	3.1	1.46	1.22
<u>Levels 3 and 4</u>				
A. Agric. forestry & field (county agent, Forest Ranger, etc.)	B. Mining	2.6	1.06	.88
"	C. Construction	3.2	.71	.59
"	D. Manufacturing	3.6	.74	.62
"	E. Transp., Communication, Gas	3.5	.76	.63
"	F. Wholesale & Retail Trade	3.6	.92	.77
"	G. Finance, Ins., & Real Estate	4.0	1.07	.89
"	H. Services	3.4	1.06	.88
"	I. Government	2.4	1.19	.99
B. Mining	A. Agric., forestry & field	2.8	1.03	.86
C. Construction	"	3.0	1.07	.89
D. Manufacturing	"	3.8	.73	.61

(Sample sheet)

RESULTS OF RATING CHANGES IN FIELD
on a scale ranging from 1 to 5

<u>Change from:</u>	<u>Change to:</u>	<u>Mean rating</u>	<u>Standard deviation of rating</u>	<u>Confidence Interval containing true mean at .05 level. Obtained mean plus or minus:</u>
<u>Levels 1 and 2</u>				
I Service	II Bus. Contact	3.0	1.07	.89
I Service	III Bus. Org'n.	3.2	1.03	.86
I Service	IV Technology	4.2	1.03	.86
I Service	V Outdoor-Natural Science	4.1	.98	.82
I Service	VI Science	3.8	1.49	1.24
I Service	VII General Cultural	1.8	1.13	.94
I Service	VIII Arts and Entertainment	4.5	.54	.45
II Bus. Contact	I Service	3.2	1.03	.86
III Bus. Org'n.	I Service	3.9	.99	.82
IV Technology	I Service	4.1	.84	.70
V Outdoor-Natural Science	I Service	4.1	.99	.86
VI Science	I Service	4.1	.64	.53
VII Gen. Cultural	I Service	2.1	1.36	1.13
VIII Arts and Entertainment	I Service	4.5	.76	.63
<u>Levels 3 and 4</u>				
I Service	II Bus. Contact	3.0	1.40	1.17
I Service	III Bus. Org'n.	3.0	.93	.78
I Service	IV Technology	3.7	1.06	.88
I Service	V Outdoor-Natural Science	4.0	.93	.78
I Service	VI Science	3.1	1.13	.94
I Service	VII General Cultural	3.4	1.19	.99
I Service	VIII Arts and Entertainment	3.6	1.06	.88
II Bus. Contact	I Service	3.8	.71	.59
III Bus. Org'n	I Service	3.2	.71	.59
IV Technology	I Service	3.9	.36	.30
V Outdoor-Natural Science	I Service	3.6	1.30	1.08
VI Science	I Service	2.8	1.03	.86
VII Gen. Cultural	I Service	2.9	1.24	1.03
VIII Arts and Entertainment	I Service	3.8	1.17	.98
<u>Levels 5 and 6</u>				
I Service	II Bus. Contact	2.1	.99	.82
I Service	III Bus. Org'n.	2.5	1.07	.89
I Service	IV Technology	2.5	1.31	1.09
I Service	V Outdoor-Natural Science	2.6	1.60	1.33

All Changes of Enterprise made by 123 Career Pattern Study Subjects
 from the date of leaving school until the follow-up interview in 1962

Nature of Move	Number of Subjects
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Manufacturing to Trade	9
Agriculture to Manufacturing	6
Manufacturing to Construction	6
Trade to Agriculture	5
Trade to Transportation	4
Trade to Government	4
Agriculture to Trade	4
Manufacturing to Finance	3
Service to Manufacturing	3
Transportation to Trade	3
Construction to Manufacturing	3
Construction to Trade	3
Trade to Service	3
Finance, etc. to Government	3
Construction to Finance, etc.	2
Construction to Government	2
Manufacturing to Agriculture	2
Manufacturing to Government	2
Transportation to Construction	2
Transportation to Service	2
Government to Service	2
Trade to Manufacturing	2
Government to Manufacturing	2
Agriculture to Construction	1
Transportation to Manufacturing	1
Government to Agriculture	1
Government to Transportation	1
Manufacturing to Service	1
Trade to Construction	1
Finance, etc. to Trade	1
Service to Trade	1
Agriculture to Government	1
Manufacturing to Transportation	1
Construction to Transportation	1
Finance to Manufacturing	1
Service to Construction	1
Service to Government	1

All Field Moves made by 123 Career Pattern Study Subjects
 from the date of leaving school until the follow-up interview in 1962

Nature of Field Move	Number making move
Technology to Business Organization	10
Business Organization to Technology	9
Outdoor to Technology	8
Business Contact to Technology	8
Technology to Business Contact	6
Technology to Service	6
Service to Technology	5
Outdoor to Business Organization	3
Technology to Outdoor	3
Business Contact to Business Organization	2
Service to Business Organization	2
Technology to General Cultural	1
Business Contact to General Cultural	1
Business Organization to Service	1
Outdoor to Service	1
Business Organization to Outdoor	1
Service to Business Contact	1
Business Contact to Service	1
Business Organization to Business Contact	1
Outdoor to Business Contact	1
Business Contact to Outdoor	1

All Level Moves made by 123 Career Pattern Study Subjects
from the date of leaving school until the follow-up interview in 1962

Nature of Level Move	Number of subjects making move
Level 5 to Level 4	22
Level 6 to Level 5	15
Level 4 to Level 3	9
Level 5 to Level 3	8
Level 5 to Level 6	5
Level 4 to Level 5	5
Level 3 to Level 5	3
Level 3 to Level 4	2
Level 4-on-job to Level 4	2
Level 5 to Level 5-Apprentice	1
Level 3 to Level 3-Apprentice	1
Level 3 to Level 4-on-job	1