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ABSTRACT

This conceptual framework for understanding the career development process defines career development as a continuous process of matching individual characteristics with organizational role requirements. Responsibility for achieving effective matching rests both with individuals and with organizations. The relative emphasis on individual efforts and organizational efforts over different phases of the career development process as a function of changing individual needs and role requirements. Summaries of research projects undertaken in the Professional Development Research Program are included in this report and present the evolution of a self-development/career planning technique incorporating these processes: (1) structured forecasting, by which individuals can identify potential gaps between present skills and role requirements and probable future role requirements, (2) goal setting and goal clarification, (3) strategy and action planning, (4) reality-testing and public commitment, and (5) identifying and using a continuous support system ("relevant others") in the implementation of personal plans. (Author/AG)

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TECHNICAL REPORT 47

CONCEPTS AND PROCESSES IN CAREER DEVELOPMENT: THE PROFESSIONAL DEVELOPMENT RESEARCH PROGRAM

John A. Miller

Management Research Center

March, 1972

This report presents a summary of literature and an overview of research conducted in the Professional Development Research Program. It was prepared to provide the background for a project funded by the Office of Naval Research, Personnel and Training Research Programs, under Contract Number N00014-67-A-0398-0006, NR 151-314.

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13. ABSTRACT

The first part of the report develops a conceptual framework for understanding the career development process. Career development is viewed as a continuous process of matching individual characteristics--e.g., needs, goals, skills, and interests--with organizational role requirements. Responsibility for achieving effective matching rests both with individuals and with organizations. The relative emphasis on individual efforts and organizational efforts shifts over different phases of the career development process as a function of changing individual needs and role requirements. The second part of the report presents summaries of research projects undertaken in the Professional Development Research Program. The primary purpose of studies in the Professional Development Research Program has been to design and evaluate methods for encouraging individual self-development commitments and actions. As by-products, data have been collected which suggest potentially useful organizational efforts. The studies described present the evolution of a self-development/career planning technique incorporating these general features: (1) a structured forecasting process, by which individuals can identify potential gaps between present skills and role requirements and probable future role requirements; (2) a goal setting and goal clarification process; (3) a strategy and action planning process; (4) a process for reality-testing and public commitment; and (5) a process for identifying and using a continuous support system ("relevant others") in the implementation of personal plans.

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FOREWORD

The Professional Development Research Program was a direct outgrowth of deliberations at a series of conferences in the late 1960's, sponsored by the Office of Naval Research, on needed research on the world of work. Conferees included: from industrial and organizational psychology, Drs. Marvin Dunnette (University of Minnesota) and Lyman Porter (University of California, Irvine); from occupational psychology, Dr. Sidney Fine (Upjohn Institute); from industrial engineering and engineering psychology, Drs. Lou Davis (University of California at Los Angeles) and Nicholas Bond (Sacramento State College); from industrial sociology, Dr. Robert Dubin (University of California at Irvine); and from industrial psychiatry, Dr. Henry L. Rosett (Mt. Sinai Hospital).

Dr. Victor Fields, former chief of the Personnel and Training Branch, Office of Naval Research, was particularly helpful in the final stages of the developing program. He provided continued support for the effort, making it possible to carry it forward to its current status. Dr. Lyman Porter contributed to the final editorial review of Exercise Future while, at the Management Research Center, Dr. Edward Ryterband (now of Hay & Associates) contributed considerably to the program planning with the assistance of Dr. John A. Haas (now also with Hay & Associates).

Although the conferences were far-ranging in their examination of the world of work, special attention was focused on motivation to work and motivation to improve one's performance. What could be seen, in particular, was that learning is a life-long affair which can be helped or hindered both by the activities of the manager or professional himself and the organization to which he belongs.

Professionals learn new ways and discard older ways because: (1) they see some discrepancy between what they do and what they would prefer to do; (2) they discover alternatives; (3) they have an opportunity to try alternatives; and (4) they find that some alternative puts them closer to where they believe they want to be. (Ryterband & Bass, in press).

The current report presents a conceptual framework, and summarizes work undertaken in the Professional Development Research Program to date. The primary emphasis of our work has been on ways in which we can enhance the process by which an individual can identify and act on the perceived discrepancies noted above, through systematic self-analyses of current and future needs of the professional and his organization.

Bernard M. Bass
Principal Investigator

PART A: CONCEPTS AND PROCESSES IN CAREER DEVELOPMENT

Framework and Objectives

Professional development is defined as the continuous process by which individual interests, abilities, and goals are matched with evolving task requirements. From a traditional organizational or managerial perspective, this matching process typically assigns a passive role to the individual. The potential employee is seen as a "given." He is to be recruited, tested, selected, classified and placed on a defined job, evaluated, and trained to meet task requirements. For many organizations--and for some people in all organizations--the question of individual choice is never posed. One's role is determined by the accidents of birth, the pressures and sanctions of the social structure, the expectations of authority figures, or the "luck" of immediately available assignments.

But many, if not most individuals can and do assume some responsibility for this matching process. First, through their ability to choose among available work environments, they join and leave organizations as a function of the adequacy of perceived "matches." Second, few organizational roles even at the lowest hierarchical level are so rigid as to preclude the individual's participation in the design of his role. And third, the constantly shifting nature of the match between individual and task requirements presents a continuous stream of choices to the individual. As a consequence, the professional today can assume un-

precedented responsibility for his own career development. Abdicating that responsibility, through the "choice of no choice," represents a failure of the matching process, with obsolescence, the waste of potential resources, and individual and organizational dissatisfaction as the outcomes.

The purpose of the Professional Development Research Program is to contribute to the understanding of this matching process. Efforts have been devoted to the design and testing of methods which provide opportunities for both individuals and organizations to take active roles in career development. The prime focus of the studies undertaken in the program so far has been on the individual's role, although important by-products of the research have included the feedback of group data to participating organizations with recommendations for potentially useful organizational efforts.

This report provides a review of literature concerned with selected aspects of the career development process, and brief summaries of studies undertaken within the Professional Development Research Program. This report is intended to serve as a background for a series of technical reports and working papers describing individual studies carried out in the program.

Overview of the Career Development Process

Rapid rates of change in the world of work place a triple burden

on professional personnel. The continuous generation of new knowledge and techniques in specialized disciplines threatens the individual with obsolescence--today's skills and knowledge will not enable him to operate effectively in tomorrow's world of work. Second, new task demands, particularly those made when technical specialists are required to take on managerial responsibilities, may require skills unfamiliar and uncomfortable for the individual. Third, individual desires for "getting ahead," apart from immediate organizational task requirements, typically conflict with day-to-day pressures for work results.

Continuing education programs of many sorts exist to help the burdened individual "keep up" or "get ahead." To some extent, organizations take active responsibility for individual employee development, but there is ultimately only one person who can and must take action in preparing for the future--the individual himself. He must plan for his own development, and then execute his plan.

Career Patterns, Progress, and Career Planning.

The concept of career patterns has changed. At one time, career or occupational choice was seen as a relatively isolated event in an individual's history. Analysis and decision were once-for-all processes to be undertaken at some point--for example, in a high school or college program. This view has been replaced by the concept of career "development as an ongoing process, involving a number of decisions to be made over time" (Samler, 1964).

Career adjustment is a developmental process. The work of D.E. Super (cf. 1953, 1956), recognized as having "set the stage for the revolutionizing and revitalization of vocational counseling" (Patterson,

1964), establishes a view of this developmental process as a series of choices based on a broad range of individual and environmental factors. These factors operate or interact to produce "compromises" (Super, 1956) between individual needs and desires and the demands and opportunities of the environment. The outcome of this series of choices is the individual's work history, or "career pattern" (Super, 1953), which continues to unfold throughout the individual's adult work life. Careers are seen as "a sort of running adjustment between a man and the various facts of life and of his professional world" (Hughes, 1958).

A similar matching framework is presented and discussed by Schein (in Kolb, et al., 1971). An individual's career pattern is seen as the outcome of two interacting processes:

1) the influence of the organization on the individual, which can be thought of as a type of acculturation or adult socialization; and,

2) the influence of the individual on the organization, which can be thought of as a process of innovation (Schein, 1968, quoted in Kolb, et al., 1971:302).

While Schein notes that these processes "coexist" continuously throughout an individual's career, he observes that one or the other is likely to predominate at different stages in a career pattern. The importance of basic stages and transition phases in a career will be seen below.

Within the developmental framework, individual efforts at career planning stress the continuous interaction of change and choice; the individual and his world of work

> . . . will affect each other and will both be affected by a complex of other factors--many of them unforeseeable; that he is not confronted totally by absolute constants in either himself or the world of work but is confronted with learning how to guide and utilize change in his behalf--with how to grow vocationally. . . (Pritchard, 1962, original emphasis).

The career planning process implied by this framework suggests an application of rational decision-making models. The process involves data gathering and analysis, the identification and evaluation of alternatives, choice, and feedback, where each step in the process entails uncertainties, costs of search and other costs and risks (cf. Cyert & March, 1963). The effectiveness of the process depends on the adequacy of the performance of the various steps in this rational process (to be discussed below). But two additional conditions must also be met: career patterns must be relatively stable and orderly, and the individual must accept the prime responsibility for his own career development.

The stability of career patterns. The first prerequisite arises from the realities of the world of work. Wilensky (1961) notes that "[m]ost men ...never experience the joys of a life plan because most of the work situations do not afford the necessary stable progression over the work-life. There is a good deal of chaos in modern labor markets, chaos intrinsic to urban-industrial society. . . .If we count the lower class. . . it is apparent that a vast majority of the labor force is going nowhere in an unorderly way or can expect a work-life of thoroughly unpredictable ups and downs" (quoted in Samler, 1964). Thus, at one extreme, career patterns are so unstable that career planning efforts would represent largely unimplementable "wishful thinking" at best. At the opposite extreme, one can imagine a work history so rigid and predictable as to obviate the necessity for individual planning. At both extremes, the individual's lack of ability to exercise some control over the outcomes

of his own decisions renders planning efforts futile. Clearly, therefore, the potentially effective individual career planning effort requires a world of work characterized by moderate levels of predictability and latitude for the exercise of individual control.

Self-development. The second prerequisite for effective career planning is the active involvement of the individual in his own developmental process. "Knowledge, skills, attitudes, and understanding are possessions which men acquire for themselves, not gifts which a company or a university can bestow" (Dill, et al., 1965, p. 119).

The importance of motivational factors in career development processes is discussed in a recent paper by Lyman Porter (1971). Using the framework of expectancy theory to analyze individuals' motivations to undertake development activities, Porter stresses the central role of motivational factors in accounting for individual efforts (1971, p. 7). These efforts may or may not lead to effective performance; other individual (e.g., ability and self-esteem) and situational variables (e.g., organizational policies and supervisory behavior) may mask the effects of motivational factors in certain situations. Nevertheless, while motivational factors may not be sufficient to account for effective career development activities, they are clearly necessary.

The implications for the role of the individual in his own career development seem clear. It is not enough simply to have training programs available or to submit people to various kinds of development programs. They must want to undergo training. But many individuals tend

to be motivated more by today's challenges than by tomorrow's; more by current than future performance. In his own self-interest, however, one cannot afford to let today's pressures preclude his thinking about tomorrow's world of work and his role in it. Thus, a large part of a successful career planning effort is to increase the individual's own desire to learn. "A man who wants to develop himself does--a man who wants to be developed rarely is" (Hull, 1964, p. 39). The ultimate goal of the organization should be, as Gardner (1963) suggests, "to shift to the individual the burden of pursuing his own education" (p. 12).

Obsolescence

The traditional view, noted above, of the passive role of the individual in the matching process typically undergoes a radical reversal when organizational representatives discuss the problem of "obsolescence." When a gap between role requirements--actual or anticipated--and individual skills is perceived by an organization, the onus tends to fall on the individual. Opportunities may be provided by organizations, but "the individual carries the basic responsibility for his own development and for keeping up to date" (NSF, 1969).

This radical shift in the locus of responsibility for career development highlights two central problems for individuals and organizations confronted with "obsolescence;" namely:

1. To what extent does the existence of "obsolescence" represent an organizational and/or an individual problem?

2. To what extent should strategies for overcoming "obsolescence" stress organizational and/or individual activities?

The burgeoning literature on the problems of technological obsolescence and professional upgrading provides some general answers, while raising further questions.

Upgrading, Updating, and Obsolescence.

The "problem of technical obsolescence" has engaged the attention of representatives of engineering and scientific professionals (cf. Weber, 1965), managers (cf. Roney, 1966), and educators (cf. Dubin & Cohen, 1970), in terms suggesting crisis situations. Until recently, however, little attention has been devoted to careful analyses of the problem area (Ferdinand, 1966) and very few systematic approaches to solving the various problems have been proposed (Mueller, 1970). Porter's (1971) use of a motivation theory approach to the problem of professional updating provides a useful framework for identifying key elements of the problem, and suggests several general steps which might be taken both by individuals and their organizations to solve the problem.

No clear definition of the concept of obsolescence has been accepted by investigators and practioners, but several aspects of the problem are typically stressed. First, technical personnel are faced with high rates of change in the "state of the art." The "half-life of a professional education at the time of graduation, which was about 20 or 30 years at the turn of the century, may be less than 10 years now, unless anti-obsolescence measures (i.e., continuing education) are taken" (Roney, 1966, p. 3). In other words, a 1960 technical degree would provide less than one-half of what the average 1960 graduate would need to know in 1970, just to keep up with the "state of the art" (Mueller, 1970).

Secondly, the problem is multidimensional; there is no clear line between competence and obsolescence. "Obsolescence may indicate the status of becoming obsolete in regard to information, attitudes, motiva-

tion, 'style,' and other components. No person is obsolete in all characteristics at once; he may show varying degrees of obsolescence in each" (Roney, 1966, p. 3). Moreover, obsolescence is a process relative to specialized fields.

> Degree of obsolescence must always be a function of new knowledge and new techniques. Many fields of science and engineering are changing rapidly with the discovery of new facts, theories, viewpoints, and techniques; the rates of change vary both among fields and among their sub-specialties. There is also the important matter of which new development or new technique is relevant to a particular person's work--not all changes affect all persons, and the impact varies in kind and degree for all those who are affected (NSF, 1969, p. 5).

Schein's analysis of career stages (in Kolb, et al., 1971) stresses a third problem area; namely, that obsolescence is a phenomenon likely to be observed at certain relatively later stages in an individual's career, during which the efforts of the individual, in comparison with those of the organization, are likely to be relatively great.

For purposes of the present study, it will be useful to distinguish between obsolescence, diversification, and upgrading, using categories suggested by Ferdinand (1966) and NSF (1969). In general terms, obsolescence of an individual refers to " a deficiency of knowledge such that he approaches problems with viewpoints, theories, and techniques less effective than others currently used in his field of specialization" (NSF, 1969, p. 5), but this broad concept overlooks different sources and types of knowledge deficiencies which may require different problem-solving strategies.

First, an individual whose technical skills in his own present area of specialization are not (or are no longer) sufficient to the present

"state of the art" exhibits areal obsolescence (Ferdinand, 1966, p. 47). His "competence ages in the face of scientific and technological growth, and makes him obsolescent as compared both to new graduates and to his colleagues who keep up and who apply new findings" (NSF, 1969, p. 5), in his own specialized area.

Second, an individual may be professionally obsolete independently of his competence in his own present area of specialization. Here, he has lost contact with broader changes in his discipline, becoming so "overspecialized" that he "cannot effectively undertake new work in his own or closely related fields, and cannot apply new knowledge from [the wider discipline] to his own particular specialty" (NSF, 1969). While areal and professional obsolescence may be related (an individual who is obsolete in one or more subareas is probably obsolete with respect to the broader discipline), they are not necessarily so: the highly competent narrow specialist may maintain that competence at the expense of professional obsolescence.

A third area of concern often included under discussions of obsolescence represents a particularly acute problem for technical personnel. The concept of ex-officio obsolescence (Ferdinand, 1966, p. 48) refers to an evolving career pattern, such that the individual "moves away from his original field of training" (NSF, 1969). Here, "up-to-the-minute knowledge of [his] discipline is not absolutely essential to [his present task] effectiveness" (Ferdinand, 1966, p. 48). The typical case in professional environments concerns the promotion of a highly competent technical specialist to an administrative position. This form of obso-

lescence may lead to performance decrements for the organization due, for example, to the impaired ability of the once-competent specialist to evaluate the efforts of subordinate-specialists. It seems, however, that the more pressing problem in this case concerns the acquisition of new skills appropriate to new duties, rather than the maintenance of previously relevant technical skills. For this case, it seems more appropriate to speak of the need for "diversification" than of the need to avoid "obsolescence."

A fourth area related to the obsolescence problem concerns individual and organizational desires for upgrading education in present technical areas. Here, while there is no question of "obsolescence"--the individual's level of competence is sufficient for present tasks--an individual may be able to raise the level of his formal capabilities and qualify for increased responsibilities by, for example, pursuing an advanced degree.

In summary, actual or potential deficiencies in knowledge or skills which are observed at relatively later career stages (Schein, in Kolb, et al., 1971) may represent:

1. Obsolescence, either professional or areal, requiring updating of a person's education in his field;
2. New task requirements, such as managerial duties, requiring diversification through educational activities in new fields and
3. Desire for technical advancement, oriented toward increased future responsibilities, requiring upgrading in present fields (cf. NSF, 1969).

Strategies for Continuing Education

Updating, diversification, and upgrading are conceptually distinguishable, and may imply different strategies of continuing education (NSF, 1969). Ferdinand (1966) provides a characterization of individuals depending upon the presence of particular combinations of areal, professional, and ex-officio obsolescence. He concludes that "efficient utilization of retraining and remedial programs. . . requires an evaluation of the kinds of obsolescence present in each case and the causes behind them" (p. 51).

While strategies for updating, diversification and upgrading may overlap, it will be useful to describe available modes of continuing education along a general dimension which stresses organizational vs. individual efforts. At one extreme, organizational policies and practices may be specifically designed to force continuing education, independently of individual initiatives.

For example, Ferdinand describes a typical problem encountered among engineering and scientific personnel in defense-oriented organizations: professional, as opposed to areal or ex-officio obsolescence. He notes that in defense-oriented R & D environments, rapidly evolving technology and constant shifts in task requirements represent a particular threat to the specialist--one who is competent in terms of his present area of specialization, but "is highly vulnerable to any radical changes that his discipline may undergo in the future" (p. 51), or to changes in task requirements. For the specialist, obsolescence only becomes apparent when he is required to undertake new or expanded assignments. Within a general framework of continuing education, Ferdinand suggests possible strategies for avoiding specialists' professional obsolescence. By

assigning specialists to several tasks simultaneously or by job rotation after only relatively short periods on any given project, "they [would never be] allowed to settle comfortably into a narrow niche, and although they may be nagged by a sense of never having fully mastered any project, they [would be] forced to maintain a competency in several allied fields simultaneously" (1966, p. 53). The aim of such strategies is basically defensive, stressing the avoidance of a decremental process.

Similar organization-based strategies include regular in-house seminars and conferences, required lectures and short courses, and coaching, counseling, and mutual goal-setting sessions as part of a performance appraisal program. In general terms, such strategies are associated with updating education for the avoidance of obsolescence. Furthermore, such organization-based strategies are likely to be more prevalent at earlier stages in a career (Schein, in Kolb, et al., 1971).

At the opposite extreme, individual efforts are undertaken based on personal desires for advancement independent of clearly defined organizational requirements. Apart from cases of individuals leaving the organization entirely to pursue their educations, such strategies include sabbatical leaves without pay, night school programs, systematic off-the-job reading programs, and the like. These strategies are primarily individual upgrading efforts, reflecting an active process of "getting ahead" rather than the defensive process of "keeping up," and are more likely at middle and later career stages than during early organizational socialization stages (Schein, in Kolb, et al., 1971).

Between these extremes, organizations provide a wide range of educational opportunities which require more or less individual initiative and

upon which managements place various restrictions. Examples include paid expenses to professional meetings and conferences, tuition refund plans, time off for parttime courses, and sabbatical leaves with pay (NSF, 1969, chapter III). Where updating and diversification efforts reflect relatively immediate organizational requirements--e.g., planned project changes, or promotion to administrative duties--management is likely to support and encourage individual development activities to a greater extent than where such activities more closely resemble upgrading beyond present task requirements.

Organizational practices. A broad-scale survey of 17 industrial and governmental R & D laboratories (NSF, 1969) provides data on organizational policies and practices regarding continuing education. While "[e]mployer programs, on the whole, provide some alternatives to scientists and engineers seeking continuing education activities. . ., not all the modes which are sponsored in any one laboratory are universally available to every R & D professional who might want to use them. Management places various restrictions on these activities. . ." (p. 43). For example, policies which encourage taking university credit courses, primarily through tuition refund programs, are widespread (p. 63), but restrictions are typically placed on the number of courses per term, time off from the job, and support may be based on the extent to which such courses are considered "work related" (p. 64). However, such courses "are primarily used for diversification. . ." or upgrading, rather than for updating; "seldom does a researcher take, once again, a course he has previously taken" (p. 85).

Similarly, attendance at professional meetings receives policy support

in general, but restrictions tend to limit participation to the most highly qualified professionals. As a consequence, such attendance comes more to be seen as either a "reward" to a professional or a contribution to the organization's public relations activities, rather than a provision of an educational activity (p. 95). For educational purposes, this practice "is selective and tends to discriminate against supporting junior-level personnel . . ." (p. 96), who are thus "being deprived of the stimulation, motivation, and actual learning attributed to attending professional meetings. . ." (p. 97).

Virtually "no restrictions [are] placed on attendance" of in-house lectures and seminars, other than "the demands of the job or an unusually restrictive supervisor. . .; attendance is left up to the individual" (p. 103). However, such programs typically represent general diversification efforts and are seldom--and only by chance--useful for purposes of updating in an individual's special field.

The NSF report concludes its study of organizational policies and practices by noting:

> The three key points in top laboratory management philosophy of continuing education are: management accepts the responsibility to provide at least some opportunities for scientists and engineers in the R & D work force; management expects R & D employees to take advantage of these and other opportunities to keep themselves up to date, particularly in their own fields of specialization; and, finally, management accepts only limited responsibility for motivating the individual. Managements which provide opportunities for continuing education believe that those who do not take advantage of them are not "worth" attempting to salvage. The initiative is left to the individual (NSF, 1969, p. 43).

<u>Individual strategies</u>. As noted above (p. 2), the individual's active involvement in his own career development process is crucial. Responsibilities for providing opportunities and support may be shared by

employers, professional societies, and universities, but the "individual carries the basic responsibility for his own development and for keeping up to date" (NSF, 1969, p. 11).

> The responsibility for self-development may be expressed in two ways, either emphasizing basic motivation or extending motivation into action. First, the individual must supply the energy and initiative necessary to motivate learning. Without internal drive, individuals are unlikely to benefit from any educational experience. The individual cannot passively sit back and expect to be spoon-fed the knowledge he needs. Second, he must be alert enough to recognize his needs for learning, motivated enough to seek opportunities, and farsighted enough to make plans for fulfilling his needs. In spite of standardized curricula and impersonally rational job specifications, it is likely that no one else is in as good as, or better position than, he to determine what he needs to know and whether this need is a matter of updating or of an extending of his competence into areas considered critical to his professional growth (NSF, 1969, p. 13).

The planning process for self-education involves at least three steps: 1) establishing a learning agenda, 2) planning a strategy for learning, and 3) evaluating the chances for success (Dill, Crowston & Elton, 1965). The learning agenda is prerequisite to the other two and the most important. It is an "action planning" document which contains:

1. Statements of aims--changes that they would like to make in their knowledge, skills, attitudes, values, or relationships with other men and organizations.

2. Definitions of areas for study, search, reflection, or testing--lists of activities, experiences, or questions that can help them accomplish their aims.

3. Ideas about priorities--feelings of preference or urgency about what should be learned first. (Dill, et al., 1965, p. 120).

The authors note that "well-stated learning agendas proved to be rare among our interviewees" (p. 121). Without such a planning base, there is little chance that effective learning strategies for new areas will be pursued.

Knowledge deficiencies, either actual or potential, are typically not a matter of too little available data, but rather of too much. There is generally no lack of relevant journals, reports, symposia, training programs, or advanced courses, but rather so many potential sources of information that search and choice become intolerable burdens. In the absence of some clearly defined career goals and priorities beyond his immediate technical specialty, the individual is at a loss in choosing what to ignore. He is either potentially interested in everything new--a "tempting, but feckless, response to the burgeoning needs for education. . ." (Dill, et al., 1965, p. 120)--or in nothing beyond his present area--a built-in obsolescence guarantee.

Barriers to Individual Career Planning

Three major potential barriers to career planning activities are frequently cited in the literature on self-development: individual perceptual and motivational factors, management practices (specifically, supervisory attitudes and reward structures), and lack of planning skills.

Individual factors. Physiological aging is frequently cited as a factor responsible for decrements in learning abilities (among other performances), but there is little direct evidence of this (Roney, 1966, p. 5). It seems more likely that age-related psychological and social factors account for blocks to career planning and development.

Dill, et al. (1965) describe a complex of individual weaknesses:

> Conflict-ridden, indecisive, and dependent on others for support and guidance, some men lack the confidence to chart and manage a program of self-education. Men with a weak sense of personal identity have no purposes against which to measure opportunities and no rationale by which to commit their energies. So opportunities for learning slip by (p. 121).

A particularly acute problem for many professionals concerns the value conflicts which occur for certain individuals when a choice may be required between continuing a career as a technical specialist or shifting into a managerial career (Zaleznik, et al., 1970):

> For some, the choice is clear-cut. For others the choice may be difficult and, once made, a source of continuing ambivalence. For these latter individuals, career conflict can be an important aspect of their adult lives. And for the organizations in which they work, career conflict has potentially important costs (p.v.). . .
>
> Career problems as symptoms of deeper psychological conflicts continue basic trends in [personality] development which interfere with the individual's use of environmental opportunities. Organizations provide a range of available options through which the individual can both rediscover and utilize his talents. The developmental process can interfere with the discovery of talents so that the person is uncertain just what opportunities he can realistically select. It is as though the range of options [is] so wide that the individual is immobilized in selecting a "main track" for his career. Results of this uncertainty are evident in overchoosing on the one hand or withdrawal on the other (p. 397).

For older men, potential threats to self-esteem may constitute barriers to self-development efforts. This may be especially true of "those having relatively high rank in their organization or among their colleagues. These people often fear they will publicly 'fall on their face' in [university credit courses with much younger students enrolled], and many cannot even entertain the idea of such a shock" (NSF, 1969, p. 68).

Psychological disengagement from social or organizational demands is a process frequently noted among retirees, but may also occur among older persons while still employed (Roney, 1966, p. 5). Individuals are observed, at some point in their careers, settling at a level of performance and "coasting" into "non-strenuous shelf-type" jobs (Mueller, 1970, p. 5).

Other individual factors, such as ambition, intelligence, and energy, may also help explain individual commitments to career development activities.

Management practices. The direct supervisors of professional personnel may either help or hinder individual self-development efforts even in the face of organizational policies which do provide educational opportunities (NSF, 1969, p. 149). Supervisors may fail to provide the necessary stimulation because of their attitudes toward their employees, or they may actively discourage educational activities through their preoccupations with short-term productivity.

Three supervisory styles with respect to continuing education have been identified (NSF, 1969, pp. 132-135): "Administrators" encourage self-development activities through the active implementation of organizational policy. "Innovators" do so by "creating new opportunities in addition to the existing ones" (p. 133). But "Inactive" supervisors fail to support educational activities:

> The "Inactive" type of supervisor is basically passive and non-committal in his attitudes. Because he conceives of self-development (and continuing education) as a responsibility of the employee apart from the working environment, he neither stimulates subordinates to pursue additional knowledge nor initiates continuing education activities on their behalf. He is aware of, and deplores, the lack of motivation shown by particular individuals, but he undertakes positive action only if the employee takes the initiative and the activity is within the framework of existing policy. He will make "pious" statements about the desirability of continuing education, but in fact he subscribes to a rather fatalistic and resigned view of people and, indeed, of leadership (p. 134).

Far more serious and frequent are the barriers created by supervisory pressures for immediate results (Dill, et al., 1965, p. 121). Daily pressures are stressed to the exclusion of any ability to concentrate on what may be required for tomorrow. Competence is defined with respect to the present, not the future, so that little if any support is given to self-development efforts beyond the employee's presently defined technical specialty. Professional obsolescence is virtually certain.

Frequently, these supervisory practices reflect organizational reward norms, policies to the contrary. Many organizations base rewards

on short-term results which seem to imply that personal development efforts should occur before joining, or at least not on "company time." Taking time off to prepare for the future means, to the individual sensing these management pressures, foregoing whatever rewards attach to a "job well done" in the short run.

Recognition of the barriers created by short-term time pressures has led to "various proposals for devoting one day a week to keep up to date, or five hours, or 5 per cent of the work week. None of these appear to have received widespread acceptance, probably because no one of them fits the majority of established work schedules" (NSF, 1969, p. 14). Again the obsolescence process is built in.

Planning skills. Many managers and technical specialists devote serious and intensive effort to planning for their projects and their organizations, but very few give the same kind of systematic thought to their own personal or career plans. They can often speak clearly and forceably about organizational objectives, budgets and financial plans, material requirements and even (in the abstract) about manpower skills needed, but can say little about what they themselves would like to be doing in five years or two, or even one year, and what new skills or updated knowledge they might need to do it.

The absence of career plans among technical and managerial personnel is thus not basically a matter of the lack of rational planning skills, but more likely a matter of the novelty of applying these skills to themselves--"simply lack of practice ... [People] need help in developing

longer range views of the kinds of learning that must be done. They need guidance in devising more effective strategies for learning ... Men who know that the world is changing rapidly might be expected to be able to provide [learning agendas with statements of] aims ..., areas for study ..., [and] priorities ..., [but many] cannot easily describe explicit agendas that guide their efforts at self-education" (Dill, et al., 1965, pp. 120-121).

Summary and Implications of the Literature Review

Career development is a continuous process, an ongoing interaction between the individual and his environment. Changing environmental demands--technological advances in specialized disciplines or new tasks--threaten to outpace the individual's acquisition of necessary skills, and thus impose requirements for continuing educational activities. Individual updating, diversification, or upgrading efforts are aimed at avoiding obsolescence or at assuming new responsibilities.

Organizations have accepted some share of the responsibility for providing self-development opportunities to individuals. However, certain organizational practices constitute barriers to individual efforts despite official policies supporting self-education. Organizations therefore must go beyond the provision of opportunities in a passive sense, and actively encourage and support individual efforts. Although none of the studies in the program (to be described below) has dealt primarily with organizational strategies, survey results from several (e.g., Miller, Bass and Alexander, in press) have suggested potentially useful organizational efforts with respect to both the content and process of development efforts.

PART B: STUDIES IN THE PROFESSIONAL DEVELOPMENT RESEARCH PROGRAM

Whatever responsibilities accrue to organizations, a central responsibility for an individual's career development is his own. Given a world of work characterized by moderate levels of predictability and some latitude for the exercise of individual control, the individual can substantially enhance the effectiveness of his career development through a career planning process.

Such a process would minimally require the individual to state some goals, make some attempt to outline likely future changes in areas in which updating, diversification, or upgrading activities might be required, and formulate an action plan based on the gaps between these goals and predictions.

The transition from predictions of the future to the formulation of a plan for self-development is, for many people, an unfamiliar process, requiring guidance and support. It has been the main purpose of the Professional Development Research Program to design and test methods for providing this guidance.

Several research projects have been undertaken within the general framework of the Professional Development Research Program. The overall program itself was an outgrowth of the World of Work conferences described in the foreword. The following summaries, presented more or less chronologically, provide an overview of the efforts made to design and evaluate methods by which individuals can actively contribute to the matching process of career development.

The Future World of Work Project

The first project carried out in the Professional Development Research Program was an investigation of the implications for individual management development activities of a procedure by which middle managers assessed probable future trends in their worlds of work* (Haas, 1969).

Methods and subjects. Two sets of instruments were developed for use in this project. The first, a "World of Work Questionnaire," provided a means by which managers could describe key elements of their worlds of work, compare present situations with their predictions of probable future conditions, and identify possible "planning gaps" with respect to various dimensions of the world of work. Two versions of this questionnaire were developed from a pool of approximately 120 items. Items were administered in random order, but regrouped for data analysis and interpretation into nine logical topic areas.

The second instrument, a "Personal Development Plan," listed 51 possible skills or areas of knowledge in which managers might desire further training in preparation for their future worlds of work. In addition, this questionnaire listed 24 training techniques which respondents might want to employ in acquiring desired training. Both instruments were pretested on a sample of 59 managers enrolled in a part-time MBA program at the University of Pittsburgh.

139 middle managers, from various U. S. locations and employed by two large manufacturing firms, participated in a field experiment designed to test the effects of an individual's systematic assessment of probable future conditions in his world of work on his stated desires

*This research was funded by the Office of Naval Research, Group Psychology Branch, under ONR contract number N00014-67-A-0398-0002,NR171-029.

for training. As a by-product, survey data concerning managers' expectations for their futures were collected and analyzed. Various personal data were also collected to enable subgrouping of the sample by such factors as age, education, functional specialization, organization level, etc.

Results. Detailed analyses of both survey and experimental findings by subgroups of items and subgroups of managers are presented in Haas (1969). With respect to predictions of future work conditions (the survey data), several general results were stressed. Respondents tended to expect significant shifts in demands on their time, with planning and group activities claiming substantially more time in the future than at present. Respondents expected the influence of computers and EDP-related activities and personnel to increase. Greater flexibility in organization structure, accompanied by greater decentralization of decision-making, was expected.

With respect to training needs, respondents particularly stressed the need for upgrading skills in planning and forecasting, verbal and written communication, and supervisory techniques. Different emphases were given by different functional subgroups; e.g., production managers stressed planning skills, personnel managers stressed decision-making and human relations, etc.

Of particular importance for subsequent projects in the Professional Development Research Program were the findings regarding experimental effects (Haas, 1969: 112ff). Statistically significant differences between control group and experimental group Personal Development Plan

means (for those experimental groups using the first version of the "World of Work Questionnaire") were found. Respondents who gave systematic attention to dimensions of the future world of work tended to express a greater urgency for training in a wider range of content areas, using a broader set of training methods, than did those respondents who did not first attempt to clarify their expectations regarding the future. Supportive, but not statistically significant results were obtained by experimental groups using the second version of the questionnaire.

Implications. Haas concludes that self-development planning efforts are facilitated by a procedure which guides the planner through a systematic analysis of likely trends in his work situation. The suggested procedure provides "a vehicle by which managers can determine a 'learning agenda' as well as an order [of priorities for] attending to that agenda..."(Haas, 1969:136).

Exercise Future I

An extension of the Future World of Work project, based on reanalysis of the questionnaire and Personal Development Plan data, led to the development of Exercise Future I (Haas, et al., 1969) for use in training workshops, and consistent in format with the small group exercises developed by Bass (1967). The Program of Exercises for Management and Organizational Psychology (PEX) consists of 15 self-administered simulations, designed to serve the dual purpose of demonstrating to the participant some aspect of individual, group, or

organizational behavior, and generating, by means of self-report, research data on individual and group performance* (Bass, 1967; Bass, et al., 1971). Selected exercises are normally administered in informal small group workshop sessions for managers, training and development specialists, and other administrators in industrial, service, and public organizations.

All of the exercises follow a common general pattern. Participants first read a small amount of background material, then make individual decisions, recommendations for problem solutions, or other questionnaire responses. Next, the respondents meet in small groups to share responses, give and receive feedback, or arrive at group solutions to problems. At the conclusion of each exercise, the participant is asked to reflect on and discuss his own responses, and the interactions and responses of the group which shared his experience (Bass, et al., 1971).

Each exercise thus incorporates elements of survey research, individual and group survey feedback, and group discussion techniques to promote the integration of new knowledge, attitudes, and behaviors (Bass and Haas, 1969).

From the original Future World of Work item pool, 28 items were selected, 14 of which dealt with aspects of the individual's future world of work, and 14 dealing with the future of the organization in which the individual works.

*Initial support for this program was provided by grants from the Ford Foundation and through research contracts for data analysis from the Office of Naval Research (ONR, N00014-67-A-0398-0002, NR171-029).

Based on feedback from participants in the earlier study, two additional sub-items were designed, asking respondents to indicate the degree to which each of the 28 items was seen as of concern (or importance) and subject to the respondent's control.

In Exercise Future I (EFI), participants were asked to work individually in completing the questionnaire and scoring their responses to yield individual and organizational "expected change" scores, as well as "concern" and "control" scores. Using these indexes in a way analogous to forecasts, each individual was instructed to outline a number of specific action steps he might take as ways to prepare for the future he foresaw.

Small group discussions then took place, using a semi-structured role-playing format, with the purposes of giving and receiving feedback with regard to the clarity and feasibility of individual plans, and also to promote commitment to these plans.

EFI has been administered to 484 participants in 19 training workshops in various locations around the world. Data for each workshop group have been analyzed separately, but no systematic comparisons across groups have yet been undertaken.

Initial analyses of trainer and participant responses to the exercise have revealed several consistent response patterns of interest to subsequent phases of the program:

1. While the majority of participants regularly employ planning skills and procedures in various aspects of their work, virtually none of them had used any systematic planning approach with regard to their own career development process since leaving school.

2. When given a chance to think systematically about their future careers, most participants are able to make some predictions about likely changes in skill requirements, match these against present skills, and plan specific actions to prepare themselves to function effectively in their future careers.

3. The average respondent indicates on his initial questionnaire that two-thirds of the items are of concern or importance to his future career, but only approximately one-third are subject to his control or influence. Among the most frequently mentioned "important-but-not-controllable" items are those concerning reward systems (performance evaluation and promotion procedures), organizational control over aspects of personal life, and (understandably) the influence of government and other external groups (customers, suppliers, etc.). This implies that many respondents experience some initial sense of frustration at not being able completely to control their own careers.

4. The most consistent reaction to the group experience has been expressed as a sense of increased control; areas initially assumed to be beyond the ability of the individual to control are seen to be subject to personal effort and influence as a result of problem-solving approaches taken in the group discussion phase of the exercise.

In addition to these observations, reactions of trainers and participants have been useful in suggesting a number of modifications subsequently incorporated in a second version of Exercise Future (Miller, et al., 1970), to be described below.

Personal Development Exercises

An independent project was undertaken to develop and evaluate a program of eight self-instructional exercises for personal and interpersonal development* (Vicino, Krusell, et al., 1971). This program was designed as an educational experience for undergraduate students. Although it does not constitute a part of the Program of Exercises designed for management training described above, it parallels that program in several important respects.

Goals. Among the most important Personal Development goals specified for all eight exercises was "to help the student participants...identify areas of desired behavioral change and develop specific plans for achieving change" (Vicino, Krusell, et. al., 1971:5). Six of the eight exercises provide specific guidelines for action planning with regard to the content issues in the exercises, using instructions similar to those employed in Exercise Future. One exercise deals specifically with personal and professional goal-setting and action planning in a format adapted from Exercise Future.

Methods. The effects of the eight exercises were evaluated in a field experiment using a holdout control procedure (Massarik, 1965). Forty-eight female and 48 male freshmen volunteers were randomly assigned to 12 groups. Eight experimental groups met twice each week for 4 1/2

*This research was supported by a grant from the ESSO Educational Foundation.

weeks, completing one 2 to 3 hour exercise in each of eight sessions. A ninth session was used for assessment. Four control groups followed the same schedule, but beginning the program after the experimental groups had completed it.

Five sets of response data were collected:

1. attendance records;
2. before and after self-report measures of discrepancies between perceived actual behavior and preferred behavior (these data were generated as part of the exercises administered in the first and last group sessions);
3. ratings of participants by non-participant peers;
4. post-program evaluation questionnaire;
5. free responses from participants during the assessment session.

In addition, a number of personality measures were collected as control variables.

Results. Among the results, described in detail by Vicino, Krusell, et al. (1971), were several of direct relevance to other phases of the Professional Development Research Program. "...[T]he experimental group decreased the discrepancy between their preferred and perceived actual behavior while the control group did not show such change [in the same time period];...the experimental group changed their perceived actual behavior towards being closer to their preferred behavior while the control group did not show such a shift;...the control group replicated the previous findings when it participated in the program..." (Vicino, Krusell, et al., 1971:ii).

Preliminary R & D Survey

Research and Development personnel employed in U. S. government laboratories participated in a survey of preferences and expectations about changes taking place in a wide variety of areas related to their work* (Barrett, Bass, and Miller, 1970). The major purpose of this survey was to develop and test items (in addition to those already contained in the Exercise Future questionnaire (see above) designed for use with managers) describing aspects of the world of work especially relevant to Research and Development personnel. As a byproduct of this work, certain aspects of these preferences and expectations were noted which seem to bear on requirements for training and development efforts.

Methods. Semi-structured interviews were conducted with 20 male professional staff members of a Research and Development laboratory run by the U. S. government. The interviewees, who were asked to participate by a member of the laboratory's personnel department, were chosen to represent an approximate cross-section of the total professional staff in terms of age, hierarchical level, and technical specialty. Respondents were asked to describe their present work situations in general terms, then their preferences and expectations regarding possible future trends. Supplementary questions dealt with a number of dimensions found elsewhere (cf. Pelz and Andrews, 1966) to be important in R & D environments (e.g., freedom, diversity, creativity, professional motivations, etc.); additional questions probed areas of technical and managerial "obsolescence," training goals and needs, and educational opportunities.

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*This survey was the first phase of research conducted under ONR Contract N00014-67-A-0398-0006, NR 151-314.

Based on data from these interviews, a 46 item questionnaire was developed, containing 26 items from the original "managerial" set, 18 "R & D" items, and two items modified from the original set to apply to both populations.

This questionnaire was administered to 143 male R & D professionals employed at another government laboratory. This sample consisted of scientists, engineers, "bench" technicians and technical managers who volunteered to participate in the study.

The 46 items were grouped under eight general headings: Educational upgrading, reward structure, organizational requirements, interpersonal-intergroup relations, external concerns, computer effects, and organizational objectives. These headings were suggested by the results of factor analyses done on responses of managers to an earlier version of the Exercise Future questionnaire (Haas, 1969); the new "R & D" items were assigned to clusters judgmentally.

Four responses were required for each item on the questionnaire. First, the respondent indicated his preferences on a five-point scale, going from "I ideally would prefer [this condition] to decrease greatly in the next five years" to "I ideally would prefer [it] to increase greatly in the next five years." Next, the respondent indicated his actual expectation about the item on a similar five-point scale. Third, the respondent was asked to note whether or not the particular item is important to him, and last, he registered the amount of control or influence (much or little) he perceives to have over each condition.

Thus, the scoring system permitted comparisons between preferences and expectations about conditions which may or may not be seen as either

important or controllable. Discrepancies between preferences and expectations may signal the need for action to prepare for changing conditions. At the extreme, a large number of discrepancies between preferences and expectations in important but uncontrollable areas may indicate sufficient dissatisfaction to predict withdrawal from the organization.

Results. A more extensive discussion of the results of this preliminary survey is presented elsewhere (Barrett, Bass, and Miller, 1970). For present purposes, we focus on only several areas and items which suggested the need for action on the part of individuals or organizations (or both) to promote increased self-development efforts among R & D personnel.

Under "educational upgrading," the great majority (75%) expressed preferences for more time to devote to training and development, but fewer than one-half (44%) actually expected to have sufficient time for self-development. Moreover, 91% saw the time they spend in self-development activities as important to them, but 76% saw themselves as having control over this area.

About one-third of the respondents believe that they do not have control over their ability to remain up-to-date in their technical knowledge, although this item was among those most frequently judged as important (87%).

Data from the items under "reward structure" may help explain the gaps found under "educational upgrading." It seems clear that the probability of an individual's taking action to update or upgrade his skills will depend on his perception of a link between his development

activities and the organization's reward system (cf. Porter, 1971).

In this survey, 45% of the respondents showed a gap of at least one scale point between their preferences for merit-based rewards and their expectations that merit will actually be rewarded. Two-thirds of the respondents expected up-to-date technical knowledge to have no increased impact on promotions or salary changes in the future. Across all items under "reward structure," an average of 73% of the respondents indicated these items to be important, but only 35% felt they had control over the factors influencing rewards.

The issue of control was particularly salient for items under "organizational requirements." There was very high agreement (89%) that freedom to follow their own research interests in selecting new projects or activities was important, but only 34% felt they had control over this important aspect of their lives. Similarly, 74% felt that freedom to set their own daily work schedules was important, but only 44% felt they had control over this. The item for which there was the greatest discrepancy between importance and control was that of organizational rules and regulations. While 76% indicated the importance of rules and regulations, only 11% believed they had control. Of all clusters of items, those under "organizational requirements" showed the largest discrepancies, on the average, between preferences for change (67%) and expectations that such changes would occur (28%).

Implications. The preliminary survey highlighted several areas of concern to those involved in the development and utilization of professional manpower. First, most of the employees in these R & D labs are apparently well aware of their needs for continuous up-dating

of skills, but they feel hampered in their ability to accomplish the required up-dating. Second, individual employees appear to feel relatively powerless in the face of various organizational pressures. The data suggest a kind of "Gresham's Law"--the pressures of short-term requirements drive out preparation for meeting possible long-term requirements.

The data suggest a more specific reason for the expectation that respondents will not find sufficient time for self-development activities; namely, that such activities will not be amply rewarded. There is a need for organizations to express concern for problems of obsolescence in tangible ways--in ways which expressly allow sufficient relaxation of day-to-day work pressures and to provide opportunities for individuals to plan and execute their self-development activities. Furthermore, organizations must provide tangible evidence that individual development efforts will be rewarded.

R & D Field Experiment

A field experiment was designed to evaluate the effects of forecasting, action planning, and group discussion (the three parts of Exercise Future), using volunteer civilian subjects from two U. S. government managed R & D laboratories* (Miller, Bass, and Mihal, 1972).

Experimental Design. Volunteer subjects from each laboratory were assigned to four experimental groups by a procedure desinged to assure an even distribution of hierarchical positions (GS-levels) and technical specialties (department codes) across the experimental groups. Following this division of the sample, the four groups were assigned at random to four experimental treatment conditions, as follows:

*This study was the second project undertaken under ONR Contract Number N00014-67-A-0398-0006, NR 151-314.

I: to receive the forecasting questionnnaire (Q) alone;

II: to receive Q plus an Action Planning form (AP);

III: to receive Q, AP, and a group Discussion (D) treatment combined in Exercise Future;

IV: a "holdout" control group, to receive Exercise Future ten months after administrations to groups I, II, and III (i.e., after criterion data collection on all volunteers).

Procedure. Identical solicitation, assignment, administration, and measurement procedures were followed at both locations; treatment administrations were under the supervision of the same experimenter at all sessions in both locations.

The forecasting questionnaire (Q) was the 46-item instrument developed earlier (see above) assessing the preferences and expectations of R & D personnel regarding future conditions in their world of work.

The action planning (AP) phase included a form for specifying general goals, as well as a set of instructions for self-scoring the forecasting questionnaire (Q). These self-generated scores were designed to highlight areas in which either large changes were preferred or expected, or large gaps between preferences and expectations occurred. Respondents were then provided with a set of instructions for devising strategies and action plans in specific areas related to goal statements and the most important items from the forecasting questionnaire, as indicated by self-generated scores.

The group discussion (D) phase consisted of structured three-man planning/counseling sessions. Each participant in the trio was assigned

a role--as "planner," "advisor," and "observer," respectively--with instructions and role descriptions designed to facilitate clarification and reality-testing of goals and strategies on the part of the "planner." The roles were rotated after 30 and after 60 minutes, so that each member played all three roles in turn.

For those who participated in the group discussion phase, a short "review and debriefing" session followed the trio discussions. Administrations of Exercise Future were typically run with groups of 12 to 15 (four to five trios simultaneously). Because the trio discussions were largely unsupervised, the "debriefing" session was primarily designed to elicit process reports, to assure that instruction procedures had been followed.

Measures. Apart from data generated through the use of the forecasting questionnaire during treatments, five sets of measures were collected for all volunteer subjects:

1. An initial volunteer form provided general biographical and organizational data (birth date, department code, GS-level, etc.) which were used to assign subjects to treatment groups, and to access personnel records.

2. Personnel records provided "Time 1" data on salary history, education, training activities, and promotions and transfers.

3. Follow-up interviews were conducted with a sample of 20 participants from each experimental treatment group (I, II, and III) at each location. These in-depth interviews, conducted nine months after treatment administrations, sought information about participants' recollections of the administrations, reactions to the program, and any

activities undertaken as a result of the program.

4. A follow-up questionnaire was sent to all participants in the experimental groups (I, II, and III). Questionnaire items dealt with participant reactions to the program and activities undertaken subsequent to the program.

5. Personnel records were again tapped for "Time 2" data on salary and educational history, training activities, and promotions and transfers.

Subjects. 478 civilian R & D personnel volunteered to participate in the project (272 from one laboratory and 206 from the second). Initially, therefore, 68 persons were assigned to each experimental condition in the first laboratory, and 51 or 52 each in the second. By ten months after administrations (i.e., "Time 2"), personnel records indicated that 28 of the initial volunteers had left their respective organizations, either through resignation or transfer to other branches; in addition, four cases were dropped due to missing data at "time 1." Thus, complete sets of measures were available for 257 subjects in one location and 193 in the second, for a total of 450.

The mean age of all participants at "Time 1" was approximately 37 years. The modal GS-level for all participants was GS-12, with a range from GS-5 to GS-16 at the first location, and GS-7 to GS-14 at the second. The average participant had been employed at his present laboratory for approximately 10 years by "Time 1." The mean annual salary of all participants was approximately $16,000, with a standard deviation of approximately $3,500.

Non-participants. The scheduling of treatment administrations was arranged by local training staff personnel at each laboratory, using

the lists of treatment group assignments prepared by the researchers. Inevitably, vacation, travel, and other schedule conflicts were encountered, which, for some treatment conditions, substantially reduced the number of subjects actually participating in the assigned treatment administration. Two procedural decisions were made as a result: (1) to schedule supplementary administrations only for those personnel able to participate immediately upon return from vacation or travel duty (this accounted for less than 10% of the total participating sample at each location--16 and 14 respectively), and (2) to establish a fifth "treatment condition" at each location, representing non-participants, who would be treated as a second "control" group.

As a result of these administrative problems and the decisions made to deal with them, the final numbers for each experimental condition for both locations combined were as follows:

I.	Forecasting Questionnaire (Q)	68
II.	Q + Action Plans (AP)	63
III.	Exercise Future: Q + AP + Discussion (D)	91
IV.	Holdout Control	95
V.	Non-participants (Control)	133
	Total	450

Analyses of biographical and organizational data (age, G-S level, educational history, tenure, etc.) for these five experimental conditions showed no significant differences among the groups on any variable.

Results. A five (experimental conditions) by three (hierarchical--GS--levels) analysis of variance was performed on measures of educational

activities undertaken during the nine months subsequent to administration of experimental treatments. Highly significant differences ($p<.001$) were found in the increased number of educational activities undertaken by personnel at different hierarchical levels. This finding is interpreted as providing strong partial support for Schein's analysis of career stages (in Kolb, et al., 1971). Organizationally sponsored training and development activities are most heavily used by lower level personnel (GS-11 and below); personnel at middle levels (GS-12) do not participate actively in development activities; higher (GS-13 and above) management level personnel participate more actively than middle level personnel, but tend more actively to pursue development opportunities offered outside the organization.

Participation in career planning activities was found to be effective ($p<.05$) in enhancing the likelihood of educational activities, but this result was most strongly evident among lower level personnel (GS-11 and below). No effects were found for personnel at GS-12. Self-analysis and action planning were found useful for personnel at higher (managerial) levels.

Implications. Support for the following interpretations and suggestions is provided both by the experimental findings and by the follow-up interview and questionnaire responses of these personnel.

Lower level technical personnel (GS-11 and below) clearly benefit from career planning when they can "reality test" their plans by discussing their strategies and tactics with more experienced members of the organization (but not their own superiors). Higher level

members were apparently able to convey to younger personnel a sense of "practical alternatives"--"how to get along realistically in this outfit"--which is seldom, if ever, available to them in the normal work environment. Providing this kind of socialization experience is likely to facilitate an important career transition (Schein, in Kolb, et al., 1971). This finding suggests the utility of designing a career planning program, including strategy planning discussions with more experienced organizational members (not supervisors), for personnel who are at relatively early stages in their careers. Such a program is likely to be most useful to personnel at or near the end of their first regular assignment, or early in their second assignment in the organization (Schein, in Kolb, et al., 1971).

The finding that personnel at middle (GS-12) levels do not, in general, participate actively in training and development activities may be interpreted in at least two ways. Either these personnel find sufficient self-development on-the-job (i.e., through job performance and appraisal, feedback, and coaching from superiors and peers), and do not require off-the-job efforts to remain up-to-date or get ahead, or non-job-related development activities are being underemphasized at this level (e.g., by the pressures of short-term job activities or the relative lack of appropriate programs). Given the concerns for "obsolescence" (which presumably occurs at later stages), the latter interpretation may be more likely. In other words, this finding may imply the need for stressing "preventive maintenance" type training programs designed for middle-level personnel. Encouraging

self-development activities among middle-level personnel may thus depend more on the relaxation of job-related pressures and the provision of organizational support than on career planning activities.

The results suggest that higher level personnel (GS-13 and above) may benefit most from self-analysis and action-planning, but not necessarily from the group discussion phase of Exercise Future. It seems likely that the discussion phase would be more useful to higher level personnel if these discussions were carried on with "relevant others" (e.g., peers, immediate subordinates or superiors, family members, etc.) in addition to or rather than with lower level organization members. Modifications to the procedure based on these findings have been incorporated into a new career planning exercise, PROSPECTS (Vicino and Miller, 1972), to be discussed below.

R & D Comparative Survey

Questionnaire data were provided by 208 participants in the Exercise Future field experiment conducted at a second U.S. Government Research and Development laboratory*. These data were analyzed and compared with those from 143 participants from the first laboratory, using the same 46 item questionnaire and administrative procedures as described in the preliminary survey, above (p. 32ff). A detailed discussion of the methods and results of this comparative survey is presented elsewhere (Miller, Bass, and Alexander, 1972). This

*This analysis, extending the work done in the preliminary survey to a second sample, was the third major project undertaken under ONR Contract Number N00014-67-A-0398-0006, NR 151-314.

section summarizes those aspects of the study relevant to individual and organizational efforts to promote self-development activities.

Analysis Procedures. Initial item-by-item comparisons were made between responses from personnel at different hierarchical levels in the two organizations. Separate principal components factor analyses of both the "Preferences" data and the "Expectations" data were performed on responses from each laboratory. The similarity in dimensions found at each laboratory ($n_1 = 208$, $n_2 = 143$) argued for combining the data from both laboratories ($n = 351$) to enhance the likelihood of stability in factor structures. Factor analyses of the combined data yielded stable and similar (but not identical) dimensions of "Preferences" and of "Expectations." Based on these empirically derived categories, nine "content area indexes" were calculated for each participant. In addition, indexes were calculated for each participant based on responses to the "Importance" and "Control" items.

Results. Descriptions of item response frequencies from the second laboratory generally confirm the findings from the preliminary survey described above. Discrepancies between preferences for change and expectations of actual change were again found for items under "educational upgrading," "reward structure," and "organizational requirements." There were, however, several significant differences found in the patterns of discrepancies between the two laboratories. Participants from both organizations agree that self-development

activities are unlikely to be achieved to the level preferred; that organizational pressures will exceed the level preferred; and that rewards will not reflect technical or other merit (presumably to be enhanced by educational efforts) to the extent preferred. In each area, however, the level of preferred change was significantly greater in the second laboratory than in the first, but no differences in expectations were found; i.e., the gap between preferences and expectations was in general greater in the second organization.

Subanalyses of each index by location and hierarchical (GS) level were performed. In general, lower level personnel at both laboratories expressed preferences for greater change than did personnel at higher levels. This was particularly true for indexes in the areas of "technical skills," "autonomy," and "social action." On every index, preferences for change were greater at the second laboratory than at the first, while few differences were found in expectations.

The analysis of control scores provided a confirmation of differences between laboratories and between hierarchical levels within each laboratory. (An individual's control score is the number of items checked as being subject to his control; the mean control score across all levels at both laboratories was 15.5 out of 46 possible.) Two findings were of particular interest. A significant difference in self-reported control was found between the two laboratories: the mean for the second (the one in which the preference-expectation gap was greater) was significantly lower than for the first, across all hierarchical levels combined. Moreover, lower level personnel in

both organizations reported less control than higher level personnel, as would be expected. Of even greater interest, however, were the different distributions among hierarchical levels within each organization. Higher level personnel (GS-13 and above) in the second lab reported greater control and lower levels (GS-12 and below) less control, than their counterparts in the first organization. These findings can be summarized in terms illustrating the importance of both the total amount of control and the distribution of control in organizations (Tannenbaum, 1968). Further analyses are underway to explore the relationships between these findings and hypothesized characteristics of organizational climate and organizational tasks derived from the work of Tannenbaum and others (cf. Tannenbaum, 1968).

Summary of the Professional Development Research Program

The purpose of this section of the report has been to describe the background, some previous work, and current projects undertaken in the Professional Development Research Program. A consistent aim underlying all the studies and projects in the Program has been to discover and evaluate methods by which individuals can actively contribute to the matching process of career development.

Each of the projects reviewed has added to our understanding of this matching process, as well as to our armament of techniques which may enchance the individual's role in it.

The Future World of Work project helped demonstrate that systematic attention to probable future work conditions--using a procedure

analogous to forecasting--could assist managers to recognize an increased urgency in their needs for training. Experience with Exercise Future I indicated that a rational planning/problem-solving model could be effectively employed in career development processes, such that action planning could enhance an individual's sense of control over his own career. The Personal Development programs suggested the utility of the general approach when applied to personal and interpersonal goals as well as career goals, and underlined the importance of interpersonal and group effects on individuals' career planning efforts.

The R & D Field Experiment confirmed the usefulness of a structured individual and small group exercise in helping individuals translate broad statements of personal and professional goals into specific action plans, and in enhancing the likelihood of those plans actually being carried out. The R & D Survey permitted refinements in the procedure through the results of factor analyses on questionnaire data, and suggested, with the results of the field experiment, modifications appropriate for personnel at different hierarchical levels.

PROSPECTS. Based on the cumulative results of studies in the program, a new career planning exercise, PROSPECTS (A Program in Self-Planning and Evaluation of Career and Training Needs; Vicino and Miller, 1972) has been written and pilot-tested. PROSPECTS consists of four phases, each reflecting specific findings from the research program:

1. A self-and-job analysis, providing a structured investigation of seven major areas of career and professional concern (based on the results of factor analyses of the forecasting questionnaire);

2. A "Future Career Profile," in which goals, strategies and action plans are spelled out;

3. A group discussion, to enable participants to give and receive feedback on the clarity and feasibility of their goals and plans, and to enhance the likelihood of action through the process of public commitment; and

4. An extension and follow-up procedure, through which participants may identify and call on "relevant others" for support in achieving their stated goals, and maintain momentum in carrying out their action plans.

As was the case with other projects undertaken in the Professional Development Research Program, the primary aim of PROSPECTS is to enhance the individual's role in the process of career development. At the same time, PROSPECTS is designed to provide data for use by training and development personnel in their efforts to design the organization's role in the process.

Conclusions

Effectiveness in matching individuals with role requirements, viewed here as a continuous career development process, requires efforts on the part of both individuals and organizations. The relative emphasis on individual vis-a-vis organizational activities shifts over the course of a career. The organization's role tends to predominate at early stages,

while the impact of individual efforts tends to be greater at later stages. Similarly, the emphasis differs as a function of changing technology (e.g., in the case of updating), changing functional requirements (e.g., diversification), and changing scope of role demands (e.g., upgrading). Nevertheless, despite different emphasis throughout a career, both individual and organizational efforts are necessary; neither alone is sufficient.

The Professional Development Research Program has stressed the design and evaluation of methods for enhancing the individual's role in the process through career planning procedures. We are convinced of the contribution which individual career planning can make to the effectiveness of matching man and job.

At the same time, we have attempted to highlight areas in which organizational efforts may be needed to complement those of individuals. Organizations can contribute to effective career development in the traditional, positive sense of providing opportunities for learning on- and off-the-job (and by providing opportunities for career planning and career counseling) for their members. The organization's contribution to effectiveness may lie, however, more in recognizing and removing potential obstacles to individual career development, such as overemphasis on short-term results (and their rewards) and the absence of support from supervisors.

Individuals and organizations must assume complementary responsibilities for assuring effective career development. Without such complementary efforts, the matching process fails, resulting in wasted resources, obsolescence, and individual and organizational dissatisfaction.

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