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ABSTRACT

A total of 450 volunteer subjects from two major U.S. Navy Research and development laboratories participated in a field experiment designed to test methods for increasing individual self-development activities. Experimental subjects engaged in career planning efforts consisting of forecasting goal-setting, action-planning, and group discussion. Holdout control subjects participated only after complete criterion data collection on all subjects. Measures were taken from personnel records on the increased self-development activities engaged in by subjects following treatments. These criterion measures were supplemented by followup interview and questionnaire data. Highly significant differences (p .001) were found in the increased number of self-development activities undertaken by personnel at different hierarchical levels. Self-analysis and action planning appeared to be useful at higher (managerial) levels; no effects were found for middle-level personnel. Implications for individual and organizational training and development efforts are drawn. (Author/CK)

TECHNICAL REPORT 43

AN EXPERIMENT TO TEST METHODS OF INCREASING SELF-DEVELOPMENT ACTIVITIES AMONG RESEARCH AND DEVELOPMENT PERSONNEL

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Highly significant differences ($p < .001$) were found in the increased number of self-development activities undertaken by personnel at different hierarchical levels. Organizationally sponsored training and development activities are heavily oriented toward personnel at lower hierarchical levels; middle-level and higher level personnel do not participate actively in development activities. Higher (management) level personnel tend to pursue development opportunities offered outside the organization. Career planning was found useful ($p < .05$) in enhancing the likelihood of certain self-development activities, but this result was strong only for personnel at lower hierarchical levels. Self-analysis and action planning appeared to be useful at higher (managerial) levels; no effects were found for middle level personnel. Implications for individual and organizational training and development efforts are drawn.

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BACKGROUND

Career Development and Professional Obsolescence

The complex set of problems known as professional obsolescence has engaged the attention of engineers and scientists (cf. Weber, 1965), managers (cf. Roney, 1966), and educators (cf. Dubin and 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).

In broad terms, professional obsolescence can be characterized as a failure in the continuous process of matching evolutionary changes in invididuals' interests, abilities, needs and goals with evolving task requirements in organizations (Miller, 1972). This developmental perspective on career choice and career adjustment has only recently replaced a traditional view of career decisions as relatively isolated events in an individual's educational and work history. The common assumption that career plans are made at specific times and places outside the work environment--for example, in high school or college programs, or at "crisis points" (cf. Zaleznik, et al., 1970)--and then carried out at work is giving way to the concept of career "development as an ongoing process, involving a number of decisions to be made over time" (Samler, 1964). Career patterns (Super, 1953) continue to ur old throughout an individual's working life, by "a sort of running adjustment between a man and the various facts of life and of his professional world" (Hughes, 1958).

Within this matching framework, an individual's career pattern can be viewed as the outcome of two continuously interacting processes:

1. the organization's efforts to influence or socialize the individual, and
2. the influence of the individual on his organization (cf. Schein, 1968).

Our concern must therefore be with the nature of the efforts required of both individuals and organizations to assure effective career development.

Organizational and Individual Efforts

The relative emphasis on individual vis-a-vis organizational efforts to influence career patterns shifts over different stages in a career. Organizational efforts to socialize individuals predominate at early stages, and, to a lesser extent, after "transition points," such as promotions and transfers. Individuals tend to have their greatest influence at later career stages, but are also expected to impact the organization with increasing effectiveness after initial socialization at each successive job stage (Schein, 1968).

Traditionally, consistent with the view that career plans are formulated outside the work environment and prior to employment, organizations have tended to regard employees as passive instruments in the career development process. They are to be recruited, tested, selected, classified and placed, trained to meet well-defined role requirements, evaluated, and promoted. While more recent perspectives recognize potential individual and organizational benefits of an employee's participation in the design of his role, few mechanisms exist to encourage individuals to assume central responsibility for the matching process (Miller, 1972).

The passive role of the individual may pose few problems to organizations in which role requirements are relatively stable and well-defined. In modern technical and professional organizations, however, rapid rates of change in tasks demands--outcomes of the continuous generation of new knowledge and techniques in specialized disciplines--threaten professional personnel with obsolescence. Present skills and knowledge will not enable them to operate effectively in the future world of work. Faced with the threat of obsolescence, the central responsibility tends to be given to the individual (Miller, 1972).

Organizations alone may, in fact, be both unwilling and unable to avoid the breakdown in career patterns which obsolescence represents. Professional organizations do, of course, provide a wide variety of continuing education opportunities for their employees. They incur these costs despite the realization that the benefits of these investments--unlike investments in capital equipment--may not accrue to the organization. Organizational efforts to avoid obsolescence entail the risk of having educated future employees of other organizations. Moreover, organizational concerns for short-term results create supervisory pressures and reward systems which constitute barriers to individual self-development efforts on "company time." Taking time off to prepare for the future means foregoing whatever rewards attach to short run results. In general, organizational support for continuing education activities is provided for immediate "work-related" programs (NSF, 1969). As self-development efforts go beyond an employee's presently defined technical speciality, organizations become increasingly reluctant to provide support. For professional organizations experiencing rapid changes in the "state of the art," these practices clearly contribute to problems of obsolescence.

The National Science Foundation surveyed 17 industrial and governmental Research & Development (R&D) laboratories concerning organizational policies and practices regarding continuing education for professionals; the report concludes:

> 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).

There is a more fundamental reason that "the individual carries the basic responsibility for his own development and for keeping up to date" (NSF, 1969). It is not enough to have training programs available, or even to require that individuals participate in development programs. "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). Successful career development requires that the individual himself be motivated to learn (cf. Porter, 1971).

The Professional Development Research Program

Shifting substantial responsibility for his own career development to the individual requires that he engage in some kind of career planning activity. Such a process would minimally require the individual to state some goals, make some attempt to outline likely future changes in areas which might require self-development activities and formulate an action plan based on the gaps between these goals and predictions. Many managers and technical specialists devote serious and intensive efforts to applying such planning skills to organizational problems, but few give the same kind of systematic thought to their own personal or career plans (cf. Dill, et al., 1965). Self-development planning is, for many people, an unfamiliar process, requiring guidance and support. It is the main purpose of the Professional Development Research Program (Miller, 1972), of which this study is a part, to design and test methods for providing this guidance.

THE FIELD EXPERIMENT

A field experiment was conducted to evaluate the effects of several techniques designed to enhance the likelihood of individual self-development efforts. The general approach can be characterized as an application of rational planning and decision-making models, involving data gathering and analysis, goal setting, developing and evaluating strategic alternatives, etc. (cf. Cyert and March, 1963).

Two of the specific techniques which were applied to career planning efforts were the forecasting and action-planning steps stressed in a study of self-development "learning agendas" by Dill, et al. (1965). A third mechanism incorporated approaches suggested by the findings of various researchers (cf. Lewin, 1947; Cartwright and Zander, 196 that group discussion and public commitment are particularly effective in promoting change in attitudes and behavior.

These three techniques--forecasting, action-planning, and group discussion--had previously been incorporated into a self-administered career planning exercise, called Exercise Future (Haas, et al., 1969). Other prior research had demonstrated that self-development planning efforts were facilitated by a procedure which guided a planner through a systematic analysis of likely trends in his work situation (Haas, 1969). This first version of Exercise Future (Haas, et al., 1969) was administered to 484 participants in 19 training workshops, with encouraging results (cf. Miller, 1972). These findings, along with a large number of suggestions provided by trainers and participants, formed the basis of a revised edition of Exercise Future (Miller, Haas, et al., 1970), to be described below. It was this career planning exercise which was to be tested in the field experiment described in this report.

Hypotheses

The primary hypothesis of the study was that participation in a career planning effort would enhance the likelihood of an individual actually undertaking self-development activities. Three experimental subhypotheses were concerned with the cumulative effects of the three major career planning activities incorporated into Exercise Future; separate experimental conditions investigated the cumulative effects of forecasting, action planning, and group discussion.

In the light of Schein's (1968) analyses of career stages, it was also hypothesized that career planning activities would differentially affect self-development efforts for subjects at different career stages.

Thus, three sets of hypotheses were defined:

1. H_o: $\mu_P = \mu_C$; i.e., measures of actual self-development activities undertaken by individuals who participate in career planning (μ_P) will not differ from those (control-group) subjects who do not engage in career planning (μ_C).

   H_1: $\mu_P \neq \mu_C$.

2. H_o: $\mu_{PF} = \mu_{PA} = \mu_{PD}$; i.e., no differences in self-development activities will be found to be a function of the type of activity engaged in; forecasting alone (μ_{PF}), or with action planning (μ_{PA}) and group discussion (μ_{PD}) are all equally effective.

   H_1: $\mu_{PF} \neq \mu_{PA} \neq \mu_{PD}$.

3. H_o: $\mu_{L1} = \mu_{L2} = \mu_{L3}$; i.e., self-development activities do not depend on career stages (here, hierarchical level); activities undertaken by lower level technical and professional personnel (μ_{L1}) will not differ from those of high level non-managerial personnel (μ_{L2}) or higher level managerial personnel (μ_{L3}).

   H_1: $\mu_{L1} \neq \mu_{L2} \neq \mu_{L3}$.

Null hypotheses would be rejected at $p < .05$.

Subjects

478 civilian personnel from two major U.S. government Research and Development laboratories volunteered to participate in the project. Subjects were solicited directly by a letter from the experimenters, countersigned by local administrative personnel, after verbal approval by department managers at each laboratory. Volunteer solicitation letters described the general purpose of the project as a survey of career plans and training needs, explained time requirements, and assured anonymity. No compensation, other than "an opportunity to clarify your plans for training and development," was offered.

850 solicitation letters were mailed at one laboratory, and 500 at the other. 272 completed volunteer forms, providing general biographical and organizational data (birth date, social security number, department code, GS level) were returned directly to the experimenters from the first laboratory, for a return rate of 32%. From the second laboratory, 206 (41%) were returned.

Table 1 describes the samples from both laboratories, using data from personnel records as of the month of the first experimental treatment at each laboratory (see below for an explanation of the sample sizes used in the table).

Insert Table 1 here

Singificant differences were found between the two locations on four sample variables: age, GS level, year Federal service began, and the year of last promotion. The subjects from the first laboratory tended to be older, have begun Federal service earlier, have a higher GS rating, and have not been promoted as recently as the sample from the second. It should be noted that all of these differences may be explained in terms of one variable, age. The older individual would have begun service earlier and have achieved a higher GS rating. Since the time interval between promotions at higher levels is longer than at lower levels, he will also tend to have been promoted less recently than a younger individual.

Experimental Design

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

I. F: to engage in career forecasting alone;

II. A: to engage in forecasting plus action-planning;

III. D: to engage in forecasting, action-planning and group discussion (i.e., to complete all parts of Exercise Future);

IV. C: a "holdout" control group, to engage in Exercise Future ten months after treatment administrations to groups I, II, and III, after criterion data collection on all volunteers.

Within each experimental group, data were "blocked" into three GS level groups. With the advice of personnel specialists at each location, it was decided to group GS levels to parallel distinctions commonly made, as follows: GS 11 and below, representing bench technicians and lower-level professionals; GS 12, representing higher-level technical and professional personnel who do not ordinarily have permanent managerial responsibilities; and GS 13 and above, representing, for the most part, technical personnel with managerial responsibilities.

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.

Initially, 68 persons were assigned to each experimental condition in the first laboratory ($n_1 = 272$), and 51 or 52 each in the second ($n_2 = 206$). By ten months after administration (i.e., "Time 2"), personnel records indicated that 28 of the initial volunteers had left their respective organizations, either through resignation, transfer, or promotion. In addition, four cases were dropped due to missing data. Thus, complete sets of measures were

available for 257 subjects in the first location, and 193 in the second, for a total of 450.

The schedule of treatment administrations was arranged by local training staff personnel at each laboratory, using 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 laboratories combined were as follows:

I.	Forecasting (F) alone	68
II.	F plus Action-planning (A) alone	63
III.	F plus A plus Group Discussion (D)	91
IV.	Holdout Control	95
V.	Non-participant Control	133
	Total	450

Analyses of biographical and organizational data (age, GS level, and salary level) for these five groups at each location showed no significant differences among means on any variable. It was decided to combine data from both locations for experimental purposes.

Dependent Variables

Three measures of self-development activities actually undertaken were provided by personnel records. For each subject, the total number of courses taken, number of government-sponsored training hours, and number of non-sponsored (outside) training hours were recorded at the beginning of experimental administrations ("Time 1") and again ten months later ("Time 2"). The ratios between Time 2 and Time 1 measures for each of these variables were the primary criteria (see below).

Several sources of error in these measures must be noted. Although these records are updated monthly, personnel staff indicated that there was a normal lag-time of at least one month in entering any data. As a result, it was decided to use the data as recorded at the end of the month in which treatment administration began as "Time 1" measures. Further, courses already in progress are not recorded until completed. In the case of government-sponsored (internal) courses, this problem could be ignored, for the majority of such courses are only one or two weeks in duration. For outside (e.g., university) non-sponsored courses, however, there was a potential source of substantial error in data, because these were frequently not reported until after an entire course program was completed (e.g., a part-time degree program). None of the subjects were participants in full-time outside educational programs during the course of the experiment.

Thus, it was felt that all three measures provided information concerning the general criterion of self-development activities, but each was subject to some kind of deficiency. Government-sponsored hours were clearly the most accurately and immediately recorded, but these are typically course hours aimed at immediate work-related subjects, and thus may not reflect an individual's

efforts at long-term self-development. Non-sponsored course hours, on the other hand, are more likely to represent the individual's long-term self-development efforts, but they are clearly subject to the greatest errors in recording. Total number of courses is the most general measure, but it includes the reporting errors inherent in the non-sponsored course hour measure. Analyses of all three measures, and the relationships among them, are reported below.

Additional criterion data were collected in the form of two sets of self-report measures. Follow-up interviews were conducted with a sample of 10 participants from each of the experimental treatment groups (I, II, and III) at each location. These in-depth interviews were conducted nine months after treatment administrations, before final data collection, but late enough to assure that they could not themselves lead to individual actions which could influence Time 2 measures. These interviews sought subjective information about participants' recollections of the administrations, reactions to the program, and any activities undertaken as a result of the program.

In addition, a follow-up questionnaire was sent to all participants in the three experimental treatment groups (I, II, and III). Questionnaire items dealt with participant reactions to the program and activities undertaken subsequent to the program. The primary purpose of the follow-up interviews and questionnaire was to assess potential differences among the three career planning procedures; i.e., to gather data relevant to the second set of hypotheses.

Independent Variables

Experimental treatments consisted of the three parts of a revised Exercise Future (Miller, Haas, et al., 1970). Group I completed a 46-item forecasting

questionnaire, focussed on various aspects of the individual's future world of work, including assessments of likely changes in organizational task demands. The 46 items were grouped under eight general headings: Educational upgrading, reward structure, organizational requirements, interpersonal and intergroup relations, external concerns, computer effects, and organizational objectives. These topic headings were suggested by the results of factor analyses done on responses of managers to the original version of Exercise Future (Haas, et al., 1969).

(As a byproduct of the experiment, data concerning the preferences and expectations of all participants in the experiment were collected and analyzed. A preliminary description of these survey results (Barrett, Bass, and Miller, 1970) highlighted discrepancies between individual preferences and expectations of organizational requirements. A detailed description of the item development procedures and survey results (Miller, Bass, and Alexander, in press), and a general description of the entire Professional Devleopment Research Program, including summaries of both the experimental and survey projects (Miller, 1972), will be found elsewhere.)

Group II completed the forecasting questionnaire, then used the self-generated preferences and expectations scores as the basis for devising strategies and action plans. Specific plans were made in areas related to goal statements and to important items from the forecasting questionnaire.

Group III completed both the forecasting questionnaire and the action-planning form, then used the results as the basis of structured three-man planning/counseling discussions. Each participant in a 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.

Several comments on these treatments are necessary. First, the nature of the career planning process precluded an independent test of different approaches. Action planning clearly implies prior or concurrent forecasting and goal-setting, and a structured career planning group discussion implies prior work on action planning. Thus, the discovery of differences among the three experimental treatment groups might provide guidelines for designing career planning programs, but is clearly subordinate to the discovery of differences between any such treatment and the control subjects.

Second, the cumulative nature of the three elements implies increasing time demands for each of the three experimental groups. Completion of the forecasting questionnaire (Group 1) required an average of 55 minutes. Forecasting and action planning required an average of about 80 minutes, and the structured group discussion added 90 minutes to that. In effect, therefore, tests of differences among these treatments may represent no more than tests of the time devoted to career planning activities in general. Data concerning these alternatives were provided through the follow-up interviews and questionnaires.

GS ratings, initially provided by self-report on volunteer forms, were cross-checked with personnel records. Although several cases of misreporting (or misrecording), were discovered, these occurred within established categories (i.e., GS-11 and below, and GS-13 and above). Six promotions involving GS-level changes between Time 1 and Time 2 were recorded. Four of these occurred within established categories; for the other two, it was decided to utilize the higher, Time 2 GS rating for experimental classification. Table 2 describes the combined distribution of subjects by experimental group and hierarchical level (GS-category).

Insert Table 2 here

Analysis and Results

Table 3 presents statistics describing the elements of the three criterion measures, based on combined data from all subjects (n=450).

Insert Table 3 here

From these data, three criterion measures were calculated, as the ratios of Time 2 to Time 1 courses, government hours, and own hours respectively. The rationale for ratio rather than difference measures was that difference scores would obscure the extent to which an individual's efforts represented other than ordinary self-development activities. By choosing to measure percentage increases, specific attention was focussed on self-development efforts which could not be explained by a simple continuation of past efforts.

To avoid division by zero, a constant (=1) was added to all raw scores. Since the distributions of both the raw scores (Time 1 and Time 2) and the ratios were highly positively skewed, tests were performed on log transformations. The final criterion measures were thus in each case provided by the formula $[\log(t_2 + 1) - \log(t_1 + 1)]$.

Table 4 summarizes the mean increases in self-development activities for the five experimental conditions, grouped by three GS-level classes, for all three criterion measures.

Insert Table 4 here

Two-way analyses of variance were performed on the data in Table 4. The results of these 5 (treatment conditions) by 3 (hierarchical levels) univariate analyses are presented for each criterion measure in Table 5.

Insert Table 5 here

On the basis of these univariate analyses, the primary null hypothesis--that participation in career planning activities has no effect on actual self-development activities--could be rejected ($p < .05$) only in the case of the most general measure of such activities; namely, the total number of courses taken (see above). Results for the second measure, government-sponsored training hours, while not significant, did suggest an effect (compare Tables 4 and 5). Results for non-sponsored hours did not approach significance.

Stong support for the third, career stages (Schein, 1968) hypothesis was found for the first two criteria. Organizationally sponsored training and development activities appear to be used most heavily by lower level personnel; personnel at middle and higher levels do not appear to participate actively in self-development efforts. In general, the hypothesized pattern of results was clear only for lower-level personnel.

The appropriateness of three independent univariate analyses can be questioned to the extent to which the three criterion measures were not conceptually or empirically independent. The observed intercorrelations among these measures were as follows:

	1	2	3
1. Courses	1.000		
2. Gov't Hrs.	0.766	1.000	
3. Own Hrs.	0.437	0.159	1.000

As a consequence, a multivariate analysis of variance was performed on all data with results as described in Table 6.

Insert Table 6 here

Thus, despite the consistent patterns among means (Table 4) and the acceptable significance level for one of the univariate tests (Table 5), the multivariate test results do not strictly permit us to reject the null hypothesis with regard to experimental treatment effects. The effects of hierarchical levels remain highly significant.

Follow-up Interviews

Subjective data concerning differences among the three (cumulative) experimental treatment conditions (forecasting, action planning, and group discussion) were provided by semi-structured interviews with a sample of 10 subjects from each experimental group at each location. These interviews were conducted approximately nine months following original treatment administrations.

We attempted to generate and analyze a contingency table by a procedure in which "blind" judgmental classifications of interview protocols could be compared with actual experimental group assignments. This analysis proved to be unfeasible for more than half of the protocols, because subjects' comments regarding reactions, perceived utility, and outcomes could not be separated from descriptive comments which provided cues to the reviewer regarding actual experimental conditions. As a consequence, we can report only the following impressions regarding interviewees' reactions.

Two clear differences between subjects' comments appeared to emerge as a function of both experimental treatment conditon and hierarchical level. First, for all hierarchical levels, reactions to participation in Group 1 (forecasting alone) were clearly less positive than those of subjects in Groups 2 and 3. Typical comments of Group 1 participants included:

--It was too general to be of much help or interest to me.

--Yours is but one of a large number of management studies constantly being inflicted on our technical personnel.

--It gave me a few new ideas, but it's really difficult to see too far ahead.

--I remember very little about it.

Group 2 comments included:

--I already had goals established, but it helped me define some options.

--It made me concentrate on my future plans, rather than continue on without any real specific plans.

--I don't think there's any one best way for a man to plan his career, but a trigger or catalyst [like this] is needed.

--Participation seemed to focus my attention on three objectives... I increased my personal emphasis on completing an advanced degree... I'll get my Masters Degree in January...

Group 3 comments included:

--It helped to organize my thoughts about my future objectives.

--It confirmed many of the feelings I had...the group sessions pointed out that many people had the same ideas and problems I had.

--It was useful in providing...techniques to solve a goal problem existing at that time.

--The small group gave me some good feedback. I didn't know them before, but I've talked to one of them a lot since.

--Our group was really blunt and truthful...we could all help each other.

The second strong impression was that group discussion (experimental condition 3) was of greater practical utility to lower level participants than to those at GS-13 and above. Several lower-level participants stressed their ability to "reality test" their plans by discussing strategies with more experienced organizational members who were not their direct superiors. Higher level members were apparently able to convey to younger personnel a sense of practical alternatives--"how to get along in this outfit"--which was not normally provided in the work environment. On the other hand, higher level personnel, especially those with managerial responsibilities, frequently expressed a desire to have these kinds of discussions with "relevant others'

(e.g., peers, immediate superiors and subordinates, etc.) rather than with "non-relevant" lower level personnel.

Follow-up Questionnaires

Follow-up questionnaires were sent to all participants in the three experimental groups at both laboratories (n_1=68, n_2=63, n_3=91; total=222) nine months following treatment administrations. 180 (81%) were completed and returned; for each experimental group, returns were respectively 61 (90%), 47 (73%), and 72 (79%).

Two sets of questions were asked. The first concerned the attitudes and previous experiences of participants regarding career planning in general. No differences among experimental groups were expected on these questions, and none was found. There were, however, a number of differences between the two laboratories. Table 7 reports the percentages responding to these multiple choice questions for each laboratory, and for both combined.

Insert Table 7 here

Long range career plans are clearly the subject of relatively frequent thought on the part of these participants, but the great majority have never engaged in a formal career planning effort. They discuss career plans with their colleagues sometimes, and with their organizational superiors even less frequently. Few are very certain of what their work roles will be like in 5 years, and most recognize that some effort will be required on their parts to prepare themselves for future work requirements. Although most expect their organizations to provide at least some help in preparing for

the future, few expect to have as much time for self-development activities as they would want, and the majority feels that taking non-work-related courses to prepare for the future would be very difficult, if not impossible.

Table 8 describes reactions of participants to their career planning experiences in this program. Responses are grouped by experimental treatment within each laboratory.

Insert Table 8 here

While these data, relevant to the second set of hypotheses concerning differences among the three career planning treatment conditions, appear to suggest that more positive reactions and outcomes were associated with participation in group discussion than in action planning, and in either of these over forecasting alone, these differences are not statistically significant. Thus, the null hypothesis of no difference among treatments cannot be rejected.

Discussion and Implications

Results of this field experiment provide some evidence regarding the potential benefits of career planning efforts, and strong evidence of the effects of career stages on the self-development activities of technical and professional research and development personnel. The weakness of conclusions based on analyses of the behavioral data was in sharp contrast with the positive self-reported reactions of participants, both during treatment administrations and in follow-up interviews.

In the light of the consistent inability of researchers to find significant behavioral effects of training program which do have desired

attitudinal effects (cf. Schuster, 1970), these results are not surprising. Little weight, in general, can be given to these self-reported attitudinal data, no matter how positive, in demonstrating the effectiveness of the program. Nevertheless, participant reactions may be useful in suggesting alternative explanations for observed behavioral results. The following comments, based on reactions and observations of participants and trainers, appeared to be particularly useful in the present case.

First, effective career planning seems clearly to require going beyond the identification and analysis of cues regarding likely future demands; forecasting trends may be necessary, but only as a background for assessing the feasibility of individual goals and strategies. Those participants in Group I who did report positive reactions or outcomes also reported having used their forecasts to analyze their own goals and plans.

Second, effective implementation of career plans requires the subjective availability of action alternatives. Participants' comments frequently included references to the general lack of perceived organizational support, in the concrete forms of tuition rebates and time off for self-development efforts not directly related to short-term job demands. While this organizational reluctance may be understandable (see above), it may also prove to be short-sighted in the light of frequently-expressed organizational concerns about obsolescence.

The importance of the subjective availability of alternatives was also underlined in the consistently positive reactions of lower-level participants to group discussions in the third treatment condition. Contact with more experienced organizational members in a supportive problem-solving or

counseling atmosphere was by far the most frequently reported source of positive reactions. In contrast, higher-level personnel tended to express a frustrated desire to discuss their goals and plans with "relevant others," including those outside the work situation. When such discussions were held (two higher-level interviewees reported extensive career-oriented family discussions), highly positive reactions were noted (in fact, one of these lead to a resignation to pursue a full-time educational program in a totally non-related field).

Third, the working out of a career pattern is a relatively long-term process (Samler, 1964; Schein, 1968), the effectiveness of which cannot be assessed clearly within the kind of time frame imposed by the constraints of the present field study. Participant reports frequently mentioned the utility of the forecasting questionnaire as a guide to potentially relevant environmental or organizational areas previously ignored; but "becoming aware" of potential environmental demands does not imply undertaking any immediate activity.

Fourth, career planning, as the career pattern itself, is a continuous process; to be effective, it cannot be regarded as a one-shot effort. In an attempt to avoid even more complex treatment conditions, no interventions were planned beyond the original administrations until after Time 2 data were collected. Participant reactions tended to confirm our impression that, while this decision may have led to a clearer experimental test, it was not the most pragmatically useful one in encouraging individual self-development efforts. The single most positive reaction was a long letter attached to a follow-up questionnaire (about 10 months after participation); it noted:

"Your questionnaire happened to come during a lull, so I had time to go back and look at my little green book [Exercise Future].... I had actually forgotten [what it was all about].... I wish your reminder had come [about four months ago]...." Other comments of interviewees referred to the need for periodic updating, at least semi-annually.

A comment made by the training director of one of the laboratories provided a necessary perspective on this program, and a stimulus for continued work on our part: "If only one guy does one thing to get himself ready for the future as a result of your program, it will have been worth it." While the cost-effectiveness of this position is questionable, the data show that at least some kind of career planning technique can do better than this. The results of the study, combined with the observations and suggestions of participants and trainers, have been used to develop a new self-administered career planning program, called PROSPECTS (Vicino and Miller, 1971). The new program includes forecasting, goal setting, action-planning and group counseling discussions similar to those employed in the present program in addition to procedures for the self-analysis of skills and development needs, generating support from "relevant others" both in and outside the work situation, and periodic updating.

The results do not support a claim for the unambiguous utility of any particular career planning mechanism, nor do they imply any kind of career planning effectiveness without mutual individual and organizational efforts. They do suggest the utility, for certain persons at particular career stages, of applying those kinds of planning skills indispensable for effective organizational activities to problems associated with individual career development.

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Table 1

Biographical and Organizational Data

	Lab. 1, n_1 = 257		Lab. 2, n_2 = 193		Total, n = 450	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Age	38.85	9.50	34.76	9.35	37.10	9.46
GS-level	12.01	1.86	11.60	1.41	11.83	1.69
Year Federal Service Began	'57.59	7.52	'59.67	7.32	'58.48	7.45
Year Local Service Began	'60.55	6.32	'61.47	6.61	'60.94	6.46
Annual Salary	16,071.08	3,836.19	15,978.64	2,782.07	16,031.43	3,431.70
Year last promoted	'65.96	3.79	'67.18	3.25	'66.48	3.58

Table 2

Distribution of Subjects by Experimental Group and G.S. Rating Level

Experimental Groups	G.S. Level ≤11	12	≥13	Total
I. Forecasting (F)	17	26	25	68
II. F + Action (P)	21	22	20	63
III. F+A + Discussion (D)	27	30	34	91
IV. Holdout control	26	31	38	95
V. Non-participant control	39	42	52	133
Total	130	151	169	450

Table 3

Descriptive Statistics: Criterion Measure/Bases

(n = 450)

	Mean	S.D.	Range
1. Total Number of Courses			
Time 1	8.47	6.72	40.0
Time 2	9.67	7.93	43.0
2. Government-sponsored Hours			
Time 1	348.48	630.29	7055.0
Time 2	388.52	633.95	7055.0
3. Non-sponsored (own) Hours			
Time 1	90.86	143.95	856.00
Time 2	96.65	145.28	1096.00

Table 4

Mean Increases in Self-Development Activities

$[(\log(t_2 + 1) - \log(t_1 + 1)]$

A. Total Number of Courses

GS-level	≤11		12		≥13		Combined
Experimental Group	Mean	S.D.	Mean	S.D.	Mean	S.D.	
I. Forecasting (F)	.29	.32	.12	.20	.21	.44	.20
II. F + Action (P)	.28	.33	.14	.25	.27	.47	.23
III. F+A+Discussion (D)	.31	.39	.11	.16	.09	.16	.16
IV. Holdout control	.20	.23	.11	.15	.11	.16	.13
V. Non-participant control	.23	.32	.11	.13	.05	.07	.12
Combined	.26		.12		.12		

B. Government-Sponsored Hours

GS-level	≤11		12		≥13		Combined
Experimental Group	Mean	S.D.	Mean	S.D.	Mean	S.D.	
I. Forecasting (F)	.88	1.37	.29	.79	.43	1.21	.49
II. F + Action (P)	.73	1.57	.16	.27	.38	1.06	.42
III. F+A+Discussion (D)	.67	1.15	.25	.50	.10	.17	.32
IV. Holdout control	.44	.81	.11	.22	.13	.28	.21
V. Non-participant control	.58	1.14	.15	.25	.08	.29	.25
Combined	.63		.19		.18		

C. Non-Sponsored (Own) Hours

GS-level	≤11		12		≥13		Combined
Experimental Group	Mean	S.D.	Mean	S.D.	Mean	S.D.	
I. Forecasting (F)	.03	.12	.13	.45	.17	.74	.12
II. F + Action (P)	.43	1.04	.24	1.12	.30	1.19	.32
III. F+A+Discussion (D)	.72	1.50	.25	1.04	.20	.82	.37
IV. Holdout control	.25	.81	.50	1.24	.11	.59	.28
V. Non-participant control	.22	.86	.17	.59	.08	.50	.15
Combined	.34		.26		.15		

Table 5

Univariate Analyses of Variance
(5 Experimental Conditions X 3 GS-Levels)

A. Total Number of Courses

Source	df	SS	MS	F	P
Total	449	30.87	--	--	--
Between Groups	14	--	--	--	--
A = 5 Treatments	4	0.62	0.16	2.44	<.05 *
B = 3 GS-Levels	2	1.76	0.88	13.83	<.001 *
A x B	8	.56	0.07	1.10	>.36
Error	435	27.93	0.064	--	--

B. Government-Sponsored Hours

Source	df	SS	MS	F	P
Total	449	293.16	--	--	--
Between Groups	14	--	--	--	--
A = 5 Treatments	4	4.44	1.11	1.80	<.13
B = 3 GS-Levels	2	18.64	9.32	15.10	<.001 *
A x B	8	1.68	.21	.34	>.95
Error	435	268.395	0.617	--	--

C. Non-Sponsored (Own) Hours

Source	df	SS	MS	F	P
Total	449	348.84	--	--	--
Between Groups	14	--	--	--	--
A = 5 Treatments	4	4.12	1.03	1.33	<.26
B = 3 GS-Levels	2	2.54	1.27	1.65	<.20
A x B	8	5.92	.74	.96	>.47
Error	435	336.255	0.773	--	--

Table 6

Multivariate Analysis of Variance Results

A.	Main Effect of Experimental Treatments	
	1. F-ratio for multivariate test of equality of mean vectors	1.5623
	2. Degrees of freedom	12 and 1146
	3. P less than	0.0966
B.	Main Effect of GS-level	
	1. F-ratio for multivariate test of equality of mean vectors	5.7560
	2. Degrees of freedom	6 and 866
	3. P less than	0.0001
C.	Interaction	
	1. F-ratio for multivariate test of equality of mean vectors	0.8115
	2. Degrees of freedom	24 and 1255
	3. P less than	0.7251

Table 7

Attitudes and Experiences of Respondents Regarding Career Planning
(Percentages)

	Lab. 1 (n_1=110)	Lab. 2 (n_2=70)	Total (n=180)
1. Have you ever written a formal career plan, other than that worked out in this program?			
a. I have a formal career plan which I think about and update regularly.	11.8	4.3	8.9
b. I have made a formal career plan in the past, but I think about it only occasionally.	18.2	11.4	15.6
c. I have made a formal career plan in the past, but I have not thought about it in recent years.	8.2	10.0	8.9
d. I have never made a formal career plan.	61.8	74.3	66.7
2. Do you think about your medium and long-term career plans (5-10 years)?			
a. Very often	15.5	15.7	15.6
b. Rather often	37.3	28.6	33.9
c. Sometimes	31.8	42.9	36.1
d. Seldom	14.5	12.9	13.9
e. Never	0.0	0.0	0.0
3. Do you discuss your long-term career goals or plans with your immediate superior?			
a. Very often	0.0	1.4	0.6
b. Rather often	6.4	0.0	3.9
c. Sometimes	30.9	18.6	26.1
d. Seldom	31.8	45.7	37.2
e. Never	30.0	34.3	31.7

Table 7
(cont'd)

4.	Do you discuss your long-term career goals or plans with friends or colleagues at work (other than your immediate superior)?			
	a. Very often	4.5	0.0	2.8
	b. Rather often	18.2	12.9	16.1
	c. Sometimes	34.5	40.3	38.3
	d. Seldom	25.5	30.0	27.2
	e. Never	14.5	12.9	13.9
5.	How certain are you about the kind of job you will have five years from now?			
	a. Very certain	7.3	2.9	5.6
	b. Rather certain	22.7	22.9	22.8
	c. Somewhat certain	46.4	32.9	41.1
	d. Not too certain	10.0	25.7	16.1
	e. Not at all certain	10.0	15.7	12.2
6.	Are your present knowledge and skill levels likely to be sufficient to enable you to perform effectively on the job you will have five years from now?			
	a. I will be able to get along quite well with what I now know.	4.5	11.4	7.2
	b. I will be able to get along with what I learn on the job, without any extra effort.	17.3	18.6	17.8
	c. I will have to make some extra efforts to learn outside the normal course of my job.	61.8	58.6	60.6
	d. I will have to make substantial extra efforts outside the job.	12.7	7.1	10.6
7.	Do you have what you think is enough time to devote to self-development activities?			
	a. No time at all	7.3	9.6	7.8
	b. Rather little time	41.8	48.6	44.4
	c. Some time	42.7	38.6	41.1
	d. Rather much time	4.5	2.9	3.9
	e. As much time as I want	0.9	1.4	1.1

Table 7
(cont'd)

8.	If you would like to take a course not directly related to your present job, would you be able to do so with support from your organization (tuition refunds, paid time off from work, etc.)?			
	a. Easily	7.3	1.4	5.0
	b. With some effort	29.1	14.3	23.3
	c. With substantial effort	25.5	18.6	22.7
	d. It would be virtually impossible	35.5	60.0	45.0
9.	Will your organization provide opportunities for you to gain the knowledge and skills necessary for you to perform effectively in the job you will have five years from now?			
	a. It will provide all the learning opportunities I will need.	10.9	8.6	10.0
	b. It will provide most of them.	36.4	24.3	31.7
	c. It will provide some of them.	30.0	36.6	33.3
	d. It will provide relatively few of them.	17.3	22.9	19.4
	e. It will provide none of them.	1.8	4.3	2.8

Table 8

FOLLOW-UP REACTIONS TO CAREER PLANNING EXPERIENCES BY EXPERIMENTAL GROUP

		Lab. 1	Lab. 2
1. WAS THE EXPERIENCE USEFUL? (1=not at all; 5=very useful)			
Group I.	Forecasting (F)	1.88	2.04
Group II.	F + Action (P)	2.26	2.32
Group III.	F+A+Discussion (D)	2.49	2.40
2. DID YOU DISCUSS THE EXPERIMENT AFTERWARDS WITH OTHERS? (1=no; 4=extensively)			
Group I.	Forecasting (F)	1.5	2.1
Group II.	F + Action (P)	1.8	1.9
Group III.	F+A+Discussion (D)	2.0	2.1
3. DID YOU UNDERTAKE ANY DEVELOPMENTAL ACTIVITY BECAUSE OF THE EXPERIENCE? (Percent yes)			
Group I.	Forecasting (F)	11.4%	11.5%
Group II.	F + Action (P)	14.3%	26.3%
Group III.	F+A+Discussion (D)	19.1%	12.0%

4. IF YES TO 3, WHAT WAS THE NATURE OF THE ACTIVITY? (Summary of open-ended comments:)

- Took courses	14
- Sought different work	3
- Increased professional reading	3
- Wrote paper on self-development, including new career plan	1
- Not specified	7
TOTAL	28

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