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ABSTRACT

THE EFFECTIVENESS OF COMMUNICATIONS IN PREPARATION FOR CHANGE IN AN INSURANCE COMPANY

by John E. Nangle

This investigation was designed to explore in a setting of change the effects of intraorganizational communications and response to these communications upon both immediate and subsequent attitudes toward change.

The research site was a medium-sized insurance company in the mid-west with approximately 400 full-time employees. The company maintained a large branch office in addition to the home office. In December, 1957 an IBM 650 electronic computer was installed. This installation was destined to initially affect home office personnel the most, particularly in the IBM key-punching, accounting, office-systems, and internal auditing departments. The computer was utilized to check agents' computations and to process policies written in the home office.

An attitude questionnaire was administered to the employees of this company on two successive occasions. The first survey was conducted in November, 1957 and the posttest survey was carried out in May, 1958. A total of 283 employees responded in the pretest, and

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295 responded in the posttest. The experimental population represented both supervisory and non-supervisory personnel from both offices. A total of 246 respondents remained after adjustments were made for faulty returns.

Prior to the computer's introduction, the company carried out an information program for its employees to familiarize them with impending changes and with the computer and its capabilities. This information program consisted of bulletins from the company's president, a series of five articles in the monthly house organ, and a number of special information meetings which involved home office personnel exclusively.

From the content of the company information program, a knowledge test ($r_{tt} = .73$) was constructed which required respondents to indicate for a series of 16 statements of "factual" information, whether or not the company had made the statement or had said something opposite. Total scores reflected awareness of what the company had actually done. This independent variable was called the Degree of Informed Awareness.

A companion set of items asked respondents for their own beliefs regarding 8 statements of "fact." These same statements had earlier appeared in the knowledge test. By a comparison of awareness of management statements with opinions on these issues, a measure of belief in communications was obtained ($r_{tt} = .64$). These measures were assigned weights to indicate divergence of belief depending upon a perceived knowledge of what management was thought to have said. This independent

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Difference scores were obtained between pre and posttest measures on a 9 item scale ($r_{tt} = .42$) composed of Likert-type attitude items measuring the amount of general readiness to accept non-specific change on the job. These difference scores formed the dependent variable, Change in Readiness for Change.

A 3 item index ($r_{tt} = .72$) was used to measure the second dependent variable, response to change introduced by the computer. The total score, based on cumulated Likert type item scores, was taken as an indication of the Affective Response to the Computer.

Four basic hypotheses were tested, each predicting a positive relationship between the two independent variables and each of the change or dependent variables.

The investigation was conducted within a naturalistic setting where experimental control of all relevant secondary variables was impossible. From an initial group of 7 a priori selected secondary factors, 4 were empirically found to be related to the main variables through use of a screening process utilizing a factorial analysis of variance procedure treating score frequencies as scores. These secondary factors were: occupational level, location (home or branch office), expected involvement in the changeover, and number of contacts with sources of information.

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covariance, each analysis involving from 3 to 4 relevant secondary factors and a dependent and independent variable, where treatments were variations in the independent variable.

The extent to which employees were knowledgeable about a proposed change bore no relationship to either a specific response of like-dislike towards the computer and its expected effects ($F = 0.31, p = >.05$), or to an increase or decrease over time in readiness to accept general change in the job ($F = 0.88, p = >.05$).

Belief-disbelief in communications was found to be significantly related to Changes in Readiness for Change ($F = 4.62, p = <.05$), but not to Affective Response to the Computer ($F = 1.06, p = >.05$).

Those employees who were high disbelievers decreased the most in their general readiness to accept job changes when compared with high believers. Workers who manifested only moderate belief in communications remained relatively stable, however, in their readiness to accept or reject change as a part of the job.

It was recommended that in implementing a change program, more attention be given to building up realistic confidence among employees in the way changes are handled, and less in merely focusing attention on a program of factual information directed at the work-force.

THE EFFECTIVENESS OF COMMUNICATIONS
IN PREPARATION FOR CHANGE IN AN
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By

John E. Nangle

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The investigation to be reported was one in a series of studies being conducted by and under the sponsorship of the Labor and Industrial Relations Center, Michigan State University. At the time this study was done, Dr. Jack Stieber was the Director of Research for the Center. The research project of which this study was a part was under the dual managership of Dr. Eugene H. Jacobson of the Department of Psychology and Dr. Einar Hardin of the Economics Department. The author found most valuable the thinking of these latter two on the research design and conceptualization of the relevant variables.

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A special degree of recognition is due Dr. William D. Baten, Research Professor, Department of Agricultural Economics at Michigan State University for his consultations on statistical problems arising in the thesis research.

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Certainly no acknowledgement would be complete without my expression of appreciation for the unfailing moral support given to me by my wife, Gail, over the entirety of this effort. I would also like to thank my secretary Mrs. Eldona Holtzclaw, for her help as typist.

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CHAPTER ONE

INTRODUCTION

Almost all industrial workers share at least one thing in common - exposure to and involvement in job-oriented change. If one were asked to search out an attribute of the employment situation which is both highly persistent and pervasive it well might be changes that take place from time to time in what one does or in how it is done. Indeed, the fundamental quality of life itself is organismic, evolutionary change.

The employee sees many changes going on around him. Some of these affect him personally or are perceived as only affecting others. The onset of change is seen as rapid or slow, the rate as accelerating or diminishing.

The worker, in reacting and adjusting to change, brings into play his current perceptions and attitudes, his expectations of how changes will affect him, and his actual past experiences with change and the manner in which changes were introduced and implemented by management representatives.

A major bulk of research in the area of industrial psychology has dealt primarily with either the antecedents or the effects of change. Only recently have research studies been geared to the systematic exploration of the change process itself and specified responses to those changes.

Questions are now being asked about the identity of the correlates and conditioners of response to change; what are the variables upon

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which we can base reliable predictions about differential response to change, and what are the dimensions of change?

What has led to this current concern about the phenomenology of change? Two significant epochs in the history of industrial mechanization have been chronicled. One took place in the 1800's, the other is contemporary. I refer to the 19th Century Industrial Revolution and to what some (Mann & Hoffman, 1960, p. 191) have referred to as the "Second Industrial Revolution." These periods have been marked by an acceleration in the degree of mechanization of industrial processes and methods, and by the extensity of these innovations.

The latter so-called "revolution" refers to the impact of automation upon business and industry dating from approximately 1946 (Killingsworth, 1959). While technology of an automated sort has actually been on the industrial scene for many years, its recognition conceptually as a modern cultural entity is quite new.

Automation means many things, certainly, to many individuals. Mann and Hoffman defined automation as: "application of control devices of a feedback nature to provide self-regulating production processes" (1960, p. 191). Killingsworth differentiated factory from office automation in his bifurcated definition: "mechanization which emphasizes automatic control," and "mechanization of computation, data-processing, and record-keeping" functions (1959, p. 2). It is this latter definition which we shall make use of when the term "automation" is used.

This form of technological advancement we call automation has been responsible for innumerable changes on the business and industrial

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scene. Significant and wide-spread changes are required in organizational structure, internal training, allocation and recruitment of personnel, office space, and office procedures often before an automated process is introduced, checked out, and integrated into the work flow. Once the automated process has been incorporated into the production or work routine, changes are often observed as resultants of the changeover. Further changes in organizational structure cutting across various departments ensue, as well as changes in the hierarchical line structure. Employees find their work changing, the composition of old work groups being altered, and the meaning of their work to others and to themselves, in some cases, drastically altered. It is of little wonder, then, that psychologists and sociologists have focused attention upon man at work under these circumstances. Commenting upon this upheaval and change, Faunce (1958b) predicted that the investigator of industrial behavior will be forced to look afresh at many of his previous findings. These were derived from quasi-static, non-automated settings. Automation is fashioning such an altered industrial environment that a serious question can be raised as to what extent old findings and "principles" will apply and can be generalized to the automated setting. This type of comparative investigation should eventually lead to an accumulated body of knowledge describing isolable differences in a number of variables between the automated and non-automated industrial contexts.

The research to be reported here is a direct outgrowth of this concern and interest in the phenomenology of change. As indicated in the "Acknowledgements," this study was conducted as part of a series of pro-

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jects investigating the effects of technological change arising out of the planning, efforts, and support of the Labor and Industrial Relations Center, Michigan State University. These projects have, as their general purpose, the isolation of correlates of reactions to technological change, the exploration of patterns of response to change, the development of indices of response to change, the examination of relationships of these indices to other classes of variables, and the description of the impact of technological change upon organizations and their employees.

This particular investigation had, as its general goals, the following:

- 1) A productive investigation of the dynamic interaction between a set of empirically obtained situational variables as they operate to alter and affect employee reaction in a setting of change. A subsequent control of these situational variables is implied.

- 2) The assemblage of a descriptive picture of the insurance worker faced with a particular, specified kind of change.

- 3) An exploration into a "white-collar" semi-automated setting to ascertain exactly what factors and "change-agents" were empirically relevant; i.e., "action variables" in the sense that they significantly contributed to the variance in the independent and dependent variables under investigation.

- 4) The accumulation of data for the confirmation or rejection of certain a priori hypotheses, and the providing of results which have specific implications for future research and for the implementation of change-

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The industrial sub-culture of today emphasizes change, progress, and improvement. A "good" industry, corporation, or plant in terms of our national value system is one that is progressive and steadily changing for the better. Leaders in business and industry subscribe to this point of view if only because they must be sensitive to technological innovations for the sake of self preservation and co-existence with economic competitors. Certainly automation is seen as a means, after initial outlay, of cutting operating costs, lessening the burden of increasing wage and benefit packages for employees, and of providing rapid and quality service for the consumer.

Machine operations of a self-regulating, self-maintaining, and self-feeding nature have taken over what used to amount to many separate tasks performed by a number of operators. Today old jobs are accomplished by newly mechanized techniques with less production people involved and in a shorter time. Commensurately, quality control procedures have been provided with a greater degree of reliability. The physical layout of plants is changing, the size and composition of the work force is being altered, work-flow is modified, supervision is changing, and a multitude of related changes are taking place. With respect to the temporal quality of change, they may be gradually introduced or their onset may be quite sudden. Changes, once implemented, may represent an accelerating succession of innovations, while others may represent something merely sporadic in nature.

All of the foregoing can be seen as potentially, and indeed in fact, providing a most momentous and significant impact upon the

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industrial worker. Of course, some people experience great changes in their jobs which take place with rapidity, while others find only minor changes occurring which take place slowly. Still others experience no particular change in the way they carry out their job responsibilities, but perceive change as affecting others around them.

Organized labor, economists, and manufacturers have all joined in one way or another through means of mass media to focus upon the effects of automation as a topic of contemporary and immediate concern. This new attention directed toward the change process should not obscure the fact that change as a temporal event and as a factor influencing worker behavior and attitudes has always been with us. Automation represents just another instance of ongoing changes which are continuous in industrial and business spheres of activity. One of the most consistent characteristics of industrial effort is that, in perspective, it is always changing. Several researchers in the area of automation and its effects have pointed out that there always exists some mixture of automation with other forms of technical advancement which means that methodologically we are unable to study the effects of automation in true isolation from other simultaneous changes.

The public recognition of automation as a technological entity, and concern over its effects, was reflected in hearings held by the congressional Subcommittee on Economic Stabilization in October, 1955, December, 1956, November, 1957, and by a collection of papers solicited by the Subcommittee on Automation and Energy Resources from participants in the above mentioned hearings (Joint Economic Committee, 1960).

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With respect to the reported study, it is well at the outset to establish qualitatively what kind of an effort was put forth, namely, to define the investigation in terms of the kind of research it represents. This was essentially a field study¹ or "natural experiment"² as differentiated from a field experiment.

In this instance the changes were introduced by the organization itself. Our efforts were primarily geared to a determination of the effects of these changes on the organization and its constituent members. The industrial concern that served as our setting was not a "laboratory" in the sense that we could manipulate and hold certain variables constant, while systematically varying other factors. What was under our direct control, however, was the problem under examination, the kinds of observations made, and the measures taken.

Following Katz's (1953) categorization of field studies it can be affirmed that this study represented a combination of both an exploratory and an hypothesis-testing study.³

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1. J. R. P. French indicates that "the essential factor which differentiate the field experiment from --- the field study is the design of the research. The field experiment involves the actual manipulation of conditions by the experimenter in order to determine causal relations, whereas in the field study the research uses the selection of subjects and the measurement of existing conditions in the field setting as a method of determining correlations" (1953, p. 99).
 2. D. Katz defines the "natural experiment" as "a change of major importance engineered by policy makers and practitioners and not by the social scientist" (1953, p. 78).
 3. Katz's definition was as follows: Exploratory study - "find out what relationships exist"; Hypothesis - testing study - "obtain proof for the predicted relationship." The exploratory type of field study has two levels: discovery of the significant variables in the situation, and the discovery of relationships between variables.

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One of the principal conditions under which psychological research in a natural socio-industrial atmosphere is carried out is that it deals with the dynamic interaction between many factors, both known and unknown. These factors differentially impinge upon persons in their work and give rise to differing consequences. Nothing really stands still for the investigator in the area of the study of industrial behavior. To examine a slice of behavior at a particular point in time is to view something from which some of the vitality has been partially extracted. This is of special concern to those desirous of studying some change process, change agent, or the effects of a change. We are here concerned with three broad aspects of change: 1) what the study of change phenomena means to experimental methodology; 2) the investigation and eventual understanding of explicit variable relationships in a context of change as encountered by researchers in industrial situations; and 3) the investigation of change itself which is a direct outgrowth of the introduction and utilization of automated equipment and methods.

In order to provide a research design that can adequately cope with the phenomenology of change in a natural field setting, two considerations required satisfaction. The design must encompass the temporal aspect of change; i.e., a longitudinal study is required, and secondly, a multivariate analysis and treatment of the data is called for.

Any longitudinal investigation contains certain inherent methodological problems to be overcome. Campbell (1957) discusses at length the kinds of uncontrolled variance which can operate to produce differences between observations or measures over time which may be mistaken

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While the reported study is not an experiment in the sense as defined above, the research design utilized is in many respects similar to a Pretest-Posttest Control Group design paradigm as presented by Campbell.⁴ In essence we have O_1 and O_2 representing a sub-population which holds an expectancy that the change within the organization will affect them directly. X is present in the form of an introduced change, and O_3 and O_4 are present in the degree that they represent a sub-population which holds an expectancy that the change process will not directly affect them.

Our design deviated from Campbell's paradigm to the extent that we were also examining relationships between variables measured prior to X , in the presence of X , but not necessarily directly associated with measures in terms of X . Hence, a more explicit design model might be graphically presented as follows:

Y	O_1	X	O_2
Y	O_3		O_4

4. Campbell's design No. 4 (1957, p. 300) was expressed as follows:

O_1	X	O_2
O_3		O_4

where: O_1, O_2, O_3, O_4 represent pretest and posttest measures or observations taken over time. X represents an intervening or conditioner variable. The difference $(O_1 - O_2) - (O_3 - O_4)$ is equivalent to the effects of X .

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Where Y = an independent variable which is present before and during the change for all groups. It is possible to have, then, an examination of the relationships between Y-O₁, Y-O₂, Y-O₃, Y-O₄, O₁-O₂, and O₃-O₄.

The design calls for a simultaneity of O₁ with O₃ and O₂ with O₄. This was achieved. This particular design also permitted the examination of experimental mortality over time. One could examine the pretest scores for lost cases and the posttest scores on pick-ups, checking on their comparability.

For Design 4, a means of encompassing all four measurements (O₁, O₂, O₃, & O₄) was achieved by computing for each subject a pretest-posttest difference score on one of the dependent variables and then examining the relationship between the independent and the dependent variables while taking into account perceived involvement in the change-over, along with other variables.

This design additionally controls for the effects of maturation and history through the simultaneity of O₁ with O₃ and O₂ with O₄. Our design provided for, and this is its major advantage, an opportunity to study the relationship of pretested variables or attitudes to the kind and amount of change in other variables over time.

The other central aspect to our general approach, other than the research design employed, was the belief that the utilization of a multivariate method of data analysis would prove to be the most meaningful and productive. This was particularly true in light of the research goals and uncontrolled natural setting within which the investigation was conducted. Interest was directed toward an exploration of the possible relationships among a number of variables in a context

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A number of authorities have stressed the value and necessity of using a multivariate approach. Cattell (1958), for example, argued for a consideration of studies in which a particular variable is investigated in the company of a whole group of variables. It was his opinion that serious omissions occur when multivariate findings are neglected, and that one single multivariate study will sometimes yield more information on the validity or non-validity of a set of hypothesized relationships than will a number of univariate studies. A single experimental study using a multivariate design with n variables will normally deal with as many relations for a given variable as will n different studies of a univariate nature. Hence, we can point to economy of procedure as one gain.

If one research goal is that of exploring the relationship between variables, the experimenter is desirous of getting as "true" an estimate of the real relationship obtaining between these variables as is possible. In a natural field setting the interaction of variables with each other is often obscured by the presence of accompanying variates which interact with one or both of the experimental variables, dependent and independent. As DuBois pointed out, "events to be studied transpire in an interacting web of variates completely out of the control of the investigator" (1957, p. 158). He was concerned with the effects of extraneous variables or concomitant variates. It is the job of the experimenter to "somehow take them (extraneous variables) into account. What we actually desire to do is to reduce to zero the correlations between conditioner variables and the dependent and independent variables." To

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In discussing the place of multivariate designs in psychological experimentation, Wrigley (1957) highlighted some of the other benefits accruing from the use of such techniques. Guidance is provided in selecting the independent and the dependent variable from a set of examined variable relationships; a method is provided for the examination of interactions, and as a means of statistically manipulating the effects of extraneous variables in cases where actual experimental control is difficult or impossible to achieve. It is exactly this latter quality of multivariate analysis which suits it so well to the research to be reported. This same investigator (Wrigley, 1957) indicated that such analyses were useful when the concern was with multiple independent (predictor) variables and multiple dependent (criteria) variables. The multivariate model provides a more realistic abstraction from the total psychological situation than does a univariate analysis.

In conclusion, a word should be said about the classes of variables which formed the nucleus of the investigation. These variates fell within three categories; there were two dependent variables, two independent variables as well as a number of situational or conditioner variables.

The dependent variables represented two distinct, although related, kinds of response to technological change. One was a global, generalized attitude toward non-specific work-related change in terms of readiness or

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hesitancy to accept such changes. The other dependent variable was an attitudinal measure of a bipolar, affective response to the change-inducer itself, in this instance a data-processor. This latter dependent variable actually reflected liking or dislike for the expected effects of a specified imminent change, and was measured prior to the change itself. The former was measured as a difference-score based upon a comparison of pretest and posttest responses.

The independent variables were related to an intraorganizational factor which was felt to be of theoretical and practical significance in fashioning attitudes towards change within a setting where a changeover was taking place. This factor was a company initiated and implemented communications program whose topic was the impending change.

One of the independent variables was a measure of the extent to which employees were factually informed about the upcoming changeover. In more specific form this reflected the degree to which the experimental population was aware of public pronouncements regarding the change via company communication channels. This was further restricted in that the pronouncements were ones which company management officials agreed were actually made or not made to their work force.

The companion independent variable was a derivation of the first in that it provided a measure of the extent of belief or disbelief in, or acceptance or rejection of, the information about the changeover as conveyed to the employees through the media of the in-company communications program.

The set of intervening or situational variables referred to factors which were found to be empirically related to the independent and/or

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dependent variables. These situational or personal-data variates included such facets of the work setting as the office where the employee was located, perceived involvement in the change, supervisory or non-supervisory level, age, and education.

The effects of these factors on the dependent and independent variables were accounted for in a multivariate analysis, since they could not be experimentally controlled.

In the following chapter we shall review some of the significant research cited in the literature which deals with the concepts of communications, attitude change, automation, and their varied interrelationships.

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CHAPTER TWO

PRIOR RESEARCH AND LITERATURE SURVEY

It is the purpose of this chapter to review the major and significant research efforts carried out to obtain a better understanding of the process of attitude change, the effects of communications upon attitudes, and response to job changes with particular emphasis upon such changes as induced by automation. In addition some of the cogent material bearing on the impact of automation, and on the use of multivariate data analysis with primary emphasis upon multiple classification analyses of covariance will be offered.

Contemporary popular periodicals and trade publications are replete with references and articles on office and factory mechanization classified as automation of one sort or another. In the former instance one finds particular emphasis upon the use of commercially available electronic digital computers for data processing and record keeping (Osborn, 1954; Ridenour, 1952; Vanselow, 1954). In the case of factories, the concern is with the introduction of automated production methods making possible continuous and automatic production through self-feeding, integration of production steps, and self control or regulation of the production flow. A description of such factory operations can be found in numerous sources. For example, Harder and David (1953) discuss automation at the Ford Motor Company, Halsbury (1955) talks about his concern with the impact of automation upon the factory working force, and Ewing (1951) discussed his interest with the requirements for management "rethinking" in the face of the automatic factory.

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Reported research of a more serious and sophisticated nature may, for the sake of convenience in discussion, be dichotomized as being related to either the factory (production methodology) or the office (clerical, computational, and record-keeping functions). The greater portion of exploratory investigations, systematic research, or merely careful observation of phenomena associated with the advent of factory automation have been conducted most frequently in automobile production factories (Faunce, 1958a, 1958b, 1959), steel plants (Walker, 1957) or in public utility power plants (Mann & Hoffman, 1960).

Activities of an analogous sort have been carried out, in the case of office automation, primarily in the accounting departments of various organizations (Craig, 1955; Mann, 1955) and within insurance companies (Faunce, 1960; Hardin, 1960a, 1960b; Jacobson, Trumbo, Cheek, & Nangle, 1959; U. S. Dept. of Labor, 1960).

As an aggregate, investigations of the sort cited above have in general supported the following broad notions about employee response to technological change:

- 1) Changes associated with a job are amenable to study and attitudinal reactions to such changes can be quantified.
- 2) The dimensions of change (kind, rate, intensity) and reactions to these can be described in a meaningful way.
- 3) Job related changes act as agents producing differential alterations in employee perceptions, expectations, and attitudes about the job and attendant changes.
- 4) Employees differ in the way they perceive changes, in their feelings about job changes, and in their responsivity to

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- 5) Correlates of worker response to change are identifiable and may serve as predictors of differential response to change.
- 6) Systematic differences in attitudes toward and about changes on the job have been found to be related to personal background factors and intraorganizational variables.
- 7) Satisfaction with imposed job changes has been found to be related to such factors as disruption of the work group and concomitant changes in the amount of job interest, responsibility, and control over work-pacing.
- 8) Response to automation is similar in kind and degree to that exhibited toward other forms of technological change.

Three areas of investigation particularly germane to the study herein reported¹ concern the process of attitude change, per se, certain organizational communications studies, and the applications of multivariate analyses of variance or covariance.

Since we shall be talking primarily about attitudinal data as the "raw material" of the study, the concept of attitude ought first to be defined. An attitude is a more or less stable opinion² or predisposi-

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1. For a discussion of empirical research conducted by the Labor and Industrial Relations Center of Michigan State University as a part of an ongoing series of investigations into the impact of automation upon insurance office settings see: Jacobson, et al. (1959), Hardin (1960a,b), Trumbo (1958) Faunce (1960), and Hardin and Hershey (1960).
 2. An opinion being the expression of an attitude; i.e., the overt written or verbalized behavior supposedly reflective of and generated by, an underlying predisposition or latent attitude.

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tion toward making some particular response, or as Hovland stated it: "attitudes are viewed as internalized anticipatory approach or avoidance tendencies toward objects, persons, or symbols" (1951, p. 427).

Doob called for a redefinition of attitudes in terms of existing behavior theory. He placed attitudes within the province of learning theory, since they are something acquired through learning. His definition of an attitude was that it represents "an implicit, drive-producing response considered socially significant in the individuals society" (Doob, 1957, p. 136). The analysis as offered by Doob emphasized that an attitude is some implicit response with a particular drive strength occurring in an individual as a reaction to stimulus patterns which affect subsequent overt responses. As such, attitudes are related to classical principles of discrimination and generalization gradients.

The focus taken here shall be upon changes elicited in attitudes as a result of some antecedent or intervening condition, occurrence, or experience. The literature in the area of attitude change is indeed abundant. A classical and traditional approach has been to effect attitudinal change by the planned manipulation of communications of one sort or another (Fine, 1957; Hovland, Harvey, & Sherif, 1957; Janis & Feshback, 1953; McGinnies & Altman, 1959; Robinson, 1954; Scott, 1957). The changes thereby induced are consequently related to correlates which serve as predictors of the effects of communications in terms of the amount and direction of the change in attitude, and assist in formulating an explanation accounting for attitude changes under varying, specified sets of conditions.

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two forms. The research designs generally call for either an experimental or a sample survey approach (Hovland, 1959). In the experimental approach, the subjects are given a controlled and predetermined exposure to a communication and the effects are evaluated in terms of change in the attitude produced. In the case of a survey approach, information is secured through interviews and/or questionnaires both concerning the respondent's exposure to communications of a specified sort and his attitudes on issues related to the communications; i.e., the object of the communications. Some of the reported studies merely limit themselves to measuring the magnitude of a change as a function of the gross content of some communication message. Frequently a control group is used to assess temporarily coincident attitude changes not associated with the communication. This group is experimentally denied exposure to the communication in question.

In connection with the investigation of attitude change a number of methodological questions require attention.

For example, Tannenbaum (1953) demonstrated that changes in attitude toward the source of a message occurred along with the main changes (attitude toward the object of the communication), and generally followed the same pattern. This researcher also obtained data indicating interaction effects between attitude toward the source and attitude toward the concept of the communication, hence suggesting that an experimenter ought to take into consideration the subjects' attitudes about the source of the communication as well as the opinion directed toward the object of the message.

Another consideration, and potential problem, has been posed by Hovland (1951). This revolved around the observed phenomena that some

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attitude changes are widely generalized to new situations, while other changes are modified in the communication situation, but do not appear to function in a closely related way to actual life situations.³ Variations in concept formation skills and motivational levels were used to explain these particular differences.

Some of the other complicating factors in this general area of investigation have been variously said to be: the influence of cumulative past experience, personality variables, perceived credibility^{4,5}

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3. Another set of discrepancies has been pointed out by Hovland (1959). These concern differing results frequently obtained from experimental (laboratory) studies as opposed to survey (naturalistic setting) studies. He spelled out seven explanatory factors for these differences: the size of the communication unit studied (single vs entire communication program), biased or representative sampling of population, the time interval used in evaluation, the types of communicators used (sponsorship of communication), the amount of post-communication interaction between subjects, the types of issues discussed in the communication, and finally the types of populations utilized. Essentially the divergence can be accounted for on the basis of different definitions of the communication situation.
 4. For a description of a study dealing with the influence of source credibility upon the effectiveness of communications, see Hovland and Weiss (1952). Their investigation lent support to the notion that some data on post-communication changes in opinion can be explained by assuming equal learning of the content whether presented by a trustworthy or an untrustworthy source, but with initial resistance to the acceptance of the material presented by an untrustworthy source. This initial resistance diminishes with time while the content is forgotten more slowly.
 5. Also, see the research reported by Fine (1957) who failed to find a relationship between opinion change and an expressed knowledge of the communicator's position or credibility.

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The validity of attitudinal data has frequently been a topic receiving too little attention in the reported research. Many studies appear to tacitly accept the proposition that the items used in fact tapped some underlying latent attitude. Two questions are combined in this case, and are in need of resolution.

One, do the survey or questionnaire scale items actually measure some identifiable, independent attitude along a meaningful continuum, and two, do verbalized or written opinions represent an isomorphic relation to overt behavioral data?

In discussing the relationship between responses to questionnaires and subsequent behavior, Doob relates that:

"the question may be answered genuinely --- but because the individual may change in the interim, because he does not think things through in advance, or because he simply cannot anticipate how he will react in a future situation that is unknown to him or out of his range of experience - the future overt response will --- be a function of other drives or attitudes that are not aroused by the question" (1957, p. 148).

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6. With respect to this variable, Hovland (1951) found that brighter persons were more likely to have their opinions changed by a communication than were the less intelligent when opinions were based mostly upon factual information. However, when the acceptance of the material was the principle determinant of attitude change, the less intelligent were more apt to be influenced, since they tended to accept practically anything communicated to them. Brighter persons were a great deal more skeptical in accepting information and drawing conclusions from it.
 7. McNemar (1956) refers to the "regression fallacy" which can account for shifts in attitudes over successive testings. The regression effect gives rise to differential effects which would erroneously be attributed to the experience or conditions introduced.

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Two workers who have been concerned with methodological considerations in the area of attitude change have been McNemar (1946) and Katona (1958). Their tack had taken the direction of a concern for the manner in which one measures pretest-posttest differences and ascribes significance to the obtained deviations or shifts between them. The change in attitude is generally measured by the difference between the mean pretest and mean posttest score, if one has pretest and posttest scores for the same sample of individuals. Other variations to this approach have been offered by the above authors.

The next section of this survey of pertinent literature deals with reported studies that treat certain communication variables and related correlates both in and out of a setting of change. A multitude of articles and books have been written on the subject of communications in business and industry. It is a popular topic of concern as a focal point for improving employee morale, promoting organizational effectiveness, developing management and supervisory skills and for creating worker approval and acceptance for company initiated changes. Its importance is underscored by the pronouncement of Bevalas and Barrett that "communication is not a secondary aspect of organized activity, but rather is the basic process out of which all other functions derive" (1951, p. 367).

Communication in the sense in which it shall be used in this investigation, and as used in the majority of other studies, is taken as the transmission of information initiated by management for consumption by all or specific levels of employees. In this sense the communicative

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act⁸ is here delimited to a downward flow. This form of communication is additionally limited in that it is differentiated from specific "job knowledge" because it does not constitute an immediate necessary prerequisite for effective work performance on the part of the recipients.

Some empirical data bearing on the importance of communications was compiled from a review (Herzberg, Mausner, Peterson, & Capwell, 1957) of sixteen studies that encompassed over 11,000 subjects. It was found that out of sixteen job factors, such as wages, job security, interest in the job, etc., communications ranked twelfth as a contributor to overall job satisfaction. In another comparative study by the same authors eleven job factors were compared for office and factory workers in terms of their significance to the overall job. Communications ranked ninth for office workers and seventh for factory workers. It was concluded that formal communications played an overall subordinate role. It was pointed out that of the studies which gave evidence on the contribution of communications, this particular aspect of the job was mentioned only as a reason for disliking a job, never as a specific reason for liking it. In addition, there appeared to be a differential perception of the importance of communications depending upon: 1) occupational level, 2) "blue-collar" or "white-collar" jobs held, 3) supervisory level, and 4) educational level.

8. Newcomb defined a communicative act as "a transmission of information, consisting of discriminative stimuli, from a source to a recipient. The discriminative stimuli have a discriminable object as referent" (1953, p. 393).

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In a study dealing with the railroading industry, Stagner, Flebbe, & Wood (1952), investigated the relationship between job satisfaction and the receipt of formal company communications. Their results failed to show a significant relationship between formal communications and mean job satisfaction scores. Neither was there any agreement between job satisfaction and the reading of company communications. However, a highly significant correlation between job satisfaction and the reported incidence of being kept informed by the foreman was obtained.

Nilsen (1954), while interviewing personnel in offices and factories, found employees complaining that they were not being told why certain work had to be done, or done in a particular way; they were not being given adequate information.

The concern with communications as a job factor and possible determiner of job satisfaction and organizational effectiveness can be said to have taken a fairly specific course and form. Most of the attention has centered around the barriers to and distortions in the transmission of information. An equivalence has often been implicitly or explicitly posited between communication effectiveness and the accurate transmission of the "message."

A number of investigations (Davis, England, & Dunnette, 1958; Funk & Becker, 1952; Odiorne, 1954; Perry & Mahoney, 1955; Shepherd & Weschler, 1955), in one way or another, have attempted to evaluate the effectiveness of communications and study related phenomena. These investigations have been structured along roughly five lines: 1) "clinical" observations over an extended period of time in order to "get the feel" of the group and thus be able to make subjective judgements about

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communication patterns;⁹ 2) a determination of who communicates with whom and how often, by the use of interviews and/or questionnaires utilizing some sociometric technique;¹⁰ 3) a determination of whether respondents were satisfied with particular kinds of information and types of media, which supposedly gives some idea of the effectiveness of the communications;¹¹ 4) communications studied as they pass a particular point which provides information about the flow of information;¹² and 5) the recording and studying of communication sequences or chains. This latter approach focuses upon some unit of information and follows it chronologically through the organization.¹³

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9. For a complete description of this method applied to a factory setting, see Roethlisberger and Dickson (1954).
 10. The reader is directed to Jacobson and Seashore's article (1951) for an expanded description of this treatment as applied to a governmental organization where the organizational structure was conceptualized in terms of communication patterns and events. Also, see the work of Shepherd and Weschler (1955).
 11. See, for example, Stagner, Flebbe, and Wood's study (1952).
 12. See Davis (1953) for a discussion of this approach. In addition the reader is referred to the work of the University of Minnesota (1955) and Odiorne (1954) on the triple audit attitude scale for the study of communications which may be applied to this approach. The triple audit consists of a communication information test, a check list of communication policies and practices, and a Consensus Scale which supposedly measures the degree of common understanding and belief among workers about company goals, procedures and policies.
 13. Davis (1953) developed a technique called "ecco-analysis" for investigating communications channels within organizations in terms of the chronological spread of a particular unit of information, within a time limit, from its origin to specified persons in the organization.

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In the process of investigating the effectiveness of communications, precedent has been firmly established for the administration of some sort of an information test to measure the amount of factual knowledge received and retained as a result of an organizational communications program. Hopefully this would afford some quantified index of the effectiveness of the program as defined as accurate and timely reception and retention of information units by particular recipients.

This use of some kind of an information or knowledge test is reflected in numerous studies (Dahle, 1954; Funk & Becker, 1952; Jacobson & Seashore, 1951; Odiorne, 1954; Perry & Mahoney, 1955; University of Minnesota, 1955). In this connection accumulated results have pointed to certain general conclusions. Negligible correlations of a disappointing sort have been found between employee attitudes toward the company and their knowledge about the company. Differences in information test mean scores have, however, been found between work groups and between occupational levels (supervisory versus non-supervisory). There is the possibility that the total amount of information transmitted to employees, rather than retained knowledge, may be related to attitudes about one's organization. Also, certain crucial areas of knowledge may be related to attitudes about the organization. Neither of these latter two suppositions have received sufficient empirical investigation to support or reject them on the basis of the literature surveyed. Another conclusion, far from surprising, has been that, generally, employees were far from being well informed about company policies or practices.

This latter finding may find its roots in either or a combination

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of four explanations. Firstly, employees at levels below supervision are generally apathetic, paying very little attention to company pronouncements of any sort. Workers, secondly, take heed only of those bits of information passed on by the management which appear to directly affect their sphere of work activity. Thirdly, and this refers to a minority of employees, because of previous bad experiences with what the company has told them, the employee learns to discount, reject, or neglect all future and subsequent company announcements as they are perceived as being untruthful, untrustworthy, or misleading. Fourthly, it may be that communications just are not properly filtered down to all echelons as they were meant to be, or they may have been subject to some distortion as they passed through the organizational communications network.

It is perhaps not what we know about the doings of our employer, in terms of factual knowledge, per se, but is rather how we perceive the motivation behind, and trustworthiness of, his communications that bears a singular and significant relationship to feelings and attitudes about the company as a whole and about specific topics which form the object of a barrage of formal communications.

Having discussed in some measure the area of communications effectiveness and how it is assessed with particular emphasis upon the usage of information tests, the next step will be to discuss the part of communications in settings more closely allied to the research setting dealt with in this study; i.e., a setting of change.

A management decision to introduce some changes in the way things are done, and the implementation of these changes, offers a clear-cut

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reason for launching a communications program. As Jacobson and Seashore (1951) indicated, communications are important "because of their function in a situation where attitudes are not yet crystallized because of the ambiguity of the work setting" resulting from various changes in work procedures, policies, etc.

Cooper (1953) has expressed his impression that the worker wants to know operating plans and changes that may affect him, changes in personnel who work with him, and anything that may directly or indirectly affect his pay, status, working conditions, career opportunities, self-esteem, or interpersonal relations.

Some observations and data have been presented on communications in a setting of change. McLean (1955), who was interested in the effects of a relocation of personnel in a hospital, commented that both disruption and anxiety were engendered by the transmission of day-to-day thoughts on the situation by management. In order to reduce the likelihood of anxiety resulting from "before the fact" communications, the timing of such communications should be geared to when "you can answer more questions than you raise." In a study carried out in a plant in Sweden (1956), it was found that the workers were especially anxious to be informed in advance about changes affecting their own work conditions.

Meredith (1955) was concerned with the problem of resistance to communications in the face of a change situation. The willingness to accept and understand communications was found to be dependent upon an appreciation by the employees of the consequences of understanding the communications in terms of a required change of practice. A corollary of this was that if there is resistance to a change there will be a

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Mellinger (1956) investigated certain communication variables in a governmental medical research institution that was significantly altering the focus of its research activities, thereby affecting all personnel. He found that communications, per se did not necessarily lead to greater agreement or mutual understanding between employees because of interpersonal distrust. This latter variable imposed a barrier to the flow of accurate communications to the extent that there were status differences and depending upon the nature of the issues involved.

Resistance to change, besides being an inherently interesting phenomenon, has attracted the attention of a number of investigators primarily, I think, because it has generated so many problems and a solution often leads to dramatic consequences and improvements. The classical example of this is a study conducted at the Harwood Manufacturing Corporation (Coch & French, 1959) in which essentially an investigation was made into the best way of communicating a change in working procedures. It was ascertained that it is possible for management to alter, reduce, or completely remove group resistance to a job-related change if that management effectively communicates the need for the change and provides for and promotes group participation in planning the change and its implementation.¹⁴

While we have been discussing communications as they are relevant to settings of change, we have as yet not specifically looked at the

14. Levine and Butler (1952) found that group decision was superior to formal lectures in overcoming resistance to change. In this instance, the change referred to merit rating behavior among a group of industrial supervisors.

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transmission of information in a strictly automated work environment. Besides relatively drastic changes in the way a job is performed, in the composition of the work group, in the layers of supervision over the worker, and in such things as work pace, job interest, and responsibility, there have been sizeable alterations in the man-to-man and man-to-machine relationships. All of these changes necessitate some kind of information program to insure an orderly transition.

The importance of keeping the employee informed about an automated changeover is highlighted by Ronken (1951), who said that a "lack of social integration in modern technology emphasizes the need for communications as to: 'where do I belong'?, and 'what does the boss think of me!'"

This is further emphasized by a statement of Walter Buchingham, Director of the School of Industrial Management, Georgia Institute of Technology (1960), who pointed out the importance of gearing a participatory communications program to the introduction of automated equipment. It is important to inform not only all those directly concerned, but also peripheral groups of workers not directly involved.

Within the automated factory, research workers have recognized barriers and obstacles to communications which were direct outgrowths of introducing automation. Faunce (1958b) pointed out that in the automobile industry the disruption of work group structure resulted in difficulty or impossibility in carrying on verbal communications among workers. The effects of the isolation of workers from one another, and disruption of established interaction patterns upon communications, has

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also been recognized by others (Levine & Butler, 1952; Walker, 1957).

One of the most recent, and certainly one of the most extensive and intensive, pieces of research in the area of the effects of automation upon the worker has been that conducted by Mann and Hoffman (1960). In the area of communications they found that personnel in an automated plant were significantly more satisfied with the amount of information they received on both the plant and company in general than were employees in a non-automated plant. They speculated that this was at least partially due to the elimination of some levels of organization in the automated plant.

Contradictory results were presented in another study which peripherally dealt with communications in an automated context. Hardin (1960a) found that when differences in satisfaction with specific aspects of the job were examined for affected and unaffected departments,¹⁵ the employees in the affected departments were significantly less satisfied with the amount of information they received. This was after the automated equipment was introduced.

Many of the changes which constitute the dynamic business and industrial scene take time; they are not introduced, implemented, or integrated into the existing organizational structure overnight. This fact places a requirement on the investigator interested in the phenomenology of change to make use of a longitudinal research design to account for the chronology of change events.

15. Affected and unaffected departments referred to those which respectively were or were not changed in some manner by the introduction of a computer.

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A number of the studies dealing with change have been of a longitudinal nature. We have already cited Coch and French's (1951) research. Some of the other studies which take time into account have been reported by Morse and Reimer (1956), Fleishman, Harris, and Burt (1955), and Lieberman (1956). Morse and Reimer investigated attitude and work productivity changes associated with an induced organizational structure change. Fleishman, et al. studied the attitude changes resulting from a foreman training program when they were exposed to the actual working situation. Lieberman was concerned with attitude changes over time which were associated with role changes in the work situation.

Utilizing pretest and posttest measures in a two year investigation within an electric utility company during a period of intensive change, Baumgartel (1954) found that positive attitudes about change were related to the perception of positive changes in the job.

The third major topic area which will be included in this survey of relevant literature covers some of the analytical and statistical procedures which have been utilized in this study; viz., multiple classification analysis of covariance.

Sutcliffe has stressed the gain in results accruing from a consideration of the effects of an independent variable upon a dependent variable in the context of other independent and "intervening" variables. He listed some virtues of the approach: 1) "it enables estimation of all main effects with the same precision as would be achieved for one in a single factor experiment of the same size; i.e., it is economical"; 2) "if there is an interaction between treatments, the factorial arrange-

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ment enables its isolation and evaluation, setting limits of generalization"; 3) "it can specify the effect of the independent variable upon a dependent variable in a variety of contexts"; and 4) "provides information about the relative efficacy of different combinations of conditions for the production of given effects" (1957, p. 134).

The application of multiple classification or factorial designs for analysis of variance and covariance has long been a familiar member of the arsenal of statistical tools which the agricultural statistician has used. Goulden (1939) provided examples of multiple classification analyses of covariance as applied to agricultural phenomena and subject matter.

In the biological sciences, for example, Smith (1958) made use of a multivariate analysis of covariance in investigating the effects of drugs upon muscle tissue.

Once researchers in the behavioral sciences became aware of the techniques and the benefits to be derived from their usage, statistical analyses based on such methods began to appear in the literature. An application in the area of educational psychology was reported by Johnson and Tsao (1945, 1959), who performed a $2 \times 3 \times 3 \times 3$ factorial analysis of covariance. In a study cited earlier Robinson (1955) made use of analysis of covariance to investigate attitude changes and their relation to persuasive communications.

Triandis (1959) explored the possible relationship obtaining between measures of cognitive similarity, perceived effectiveness of communications, and liking between two people by utilizing a triple classification analysis of variance. He mentioned in passing that some diffi-

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Other examples of the use of multiple classification analyses of covariance deal with designs of a 2X5, 2X2, and 2X4 type (Review of Educational Research, 1954). Hoyt (1952) employed a 2X4X3X3 factorial design analysis of covariance in investigating teaching methods and their effects upon the drawing abilities of school children. In this latter instance the researcher encountered the problem of handling disproportionate frequencies in data subclasses.

This, then, concludes the coverage of what appears to be major and representative contributions in the literature concerning attitudes toward change, the impact of automation, communications as a variable related to industrial change settings, and methods of multiple analyses of covariance.

16. The use of multiple analyses of variance and covariance has presented methodological problems to the behavioral scientists which do not generally plague the agriculturalist; viz., missing cases or cell entries, unequal treatment n's, and inability to obtain multiple replication of measures.

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CHAPTER THREE

THE EXPERIMENTAL SETTING AND DATA GATHERING PROCEDURES

In this chapter we shall set forth a detailed description of the research setting within which this study was conducted, the manner in which it was conducted, and the composition of the experimental population.

Before progressing with such a description, however, a word is required concerning the rationale underlying the original selection of the site.

The Labor and Industrial Relations Center (L.I.R.C.), of Michigan State University had already begun a series of office automation studies within the insurance industry. There was a desire to maintain continuity in the sense of carrying out additional investigations in a number of sites. The systematic accumulation of research data, and its subsequent analysis, would hopefully provide the substance for comparative studies of the impact of office automation within the industry, and across companies. In this manner one might be able to isolate and identify some important organizational variables that account for major differences in the way changes are introduced, handled and reacted to. An additional benefit of this approach is that by such an accumulation, one can with greater confidence draw broader conclusions and make generalizations of greater representativeness for a particular industry.

The site chosen afforded a unique opportunity in a naturalistic field setting for carrying out a longitudinal investigation. This consisted of the collection of both pretest and posttest data coordinated

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An attractive feature of the location from a research design point of view was the existence of a large branch office in addition to the home office. This configuration invited potentially interesting kinds of comparisons.

Another reason for the selection of this site, one that became apparent only as time went on during the preparatory phases of the study, was the receptiveness of the company management and their overall cooperation in assisting our efforts at conducting the study.

The Study Site

The study was conducted in a medium-sized general insurance company located in the midwest. The company has its home office in a small town in a rural area, and maintains a branch office in a large industrial metropolitan area in the same state. The company has been in business since 1915, starting as a mutual automobile insurance company. It operates entirely within the state where it is located, although it is licensed to also operate in one other state. The home office staff represented about 275 persons, the branch office about 120 employees, and there were in addition some 35 employees located in claims adjustment offices scattered about the state.

With respect to the formal organizational structure, there were three distinct governing and administrative bodies. The constituent membership of these groups, however, overlapped to a considerable degree. Firstly, there was the board of directors. Secondly, the executive committee, and lastly, the operating committee. The president,

executive vice president, secretary, and treasurer of the company were on all three committees. Also a member of the three groups was a legal assistant to the president. An additional member of the operating committee was the man who was in charge of the branch office.

The branch office was run by a quartet of four persons, with a rotating managership of about one year duration; i.e., each of the four members in turn spent a year as chairman of the branch office operating committee.

The Introduced Change

The company management decided to install an International Business Machines (IBM) 650 digital computer¹ for electronic data processing. The computer was installed in the home office during December, 1957. In preparation for the arrival of the computer a number of things were done. Several employees were sent to an IBM school in April, 1957, and an area had to be prepared for the computer equipment requiring building alterations.

The company, as do most modern insurance firms, had been making standard use of electronic data processing (EDP) equipment right along. There were the usual number of sorting, punching, and printing machines. While a computer was to be introduced, it represented just another addition to the EDP equipment already in use, although in this case it represented an addition of some magnitude and cost.

1. The IBM 650 consists of three components: the Power Unit, the Read-Punch Unit, and the Console. Information is stored on a magnetic drum memory, and input-output is achieved by use of punch cards.

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When the IBM 650 was installed, about two weeks were spent in equipment testing and program check-out. The computer was used for such tasks as checking premium computations performed by agents, computing premiums and assembling policy-declaration data for policies written in the home office, and compiling statistical and accounting reports.

The checking of agents' computations and the processing of policies written in the home office were completely automated by the beginning of May, 1958.²

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2. For a discussion of the impact the computer had on procedures and tasks for different departments in both the home and branch offices, see Hardin (1960b, pp. 926-927).

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Fig. 1. IBM
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Below in Fig. 1 is a representation of the general work flow for the IBM 650 when applied to insurance policy preparation.

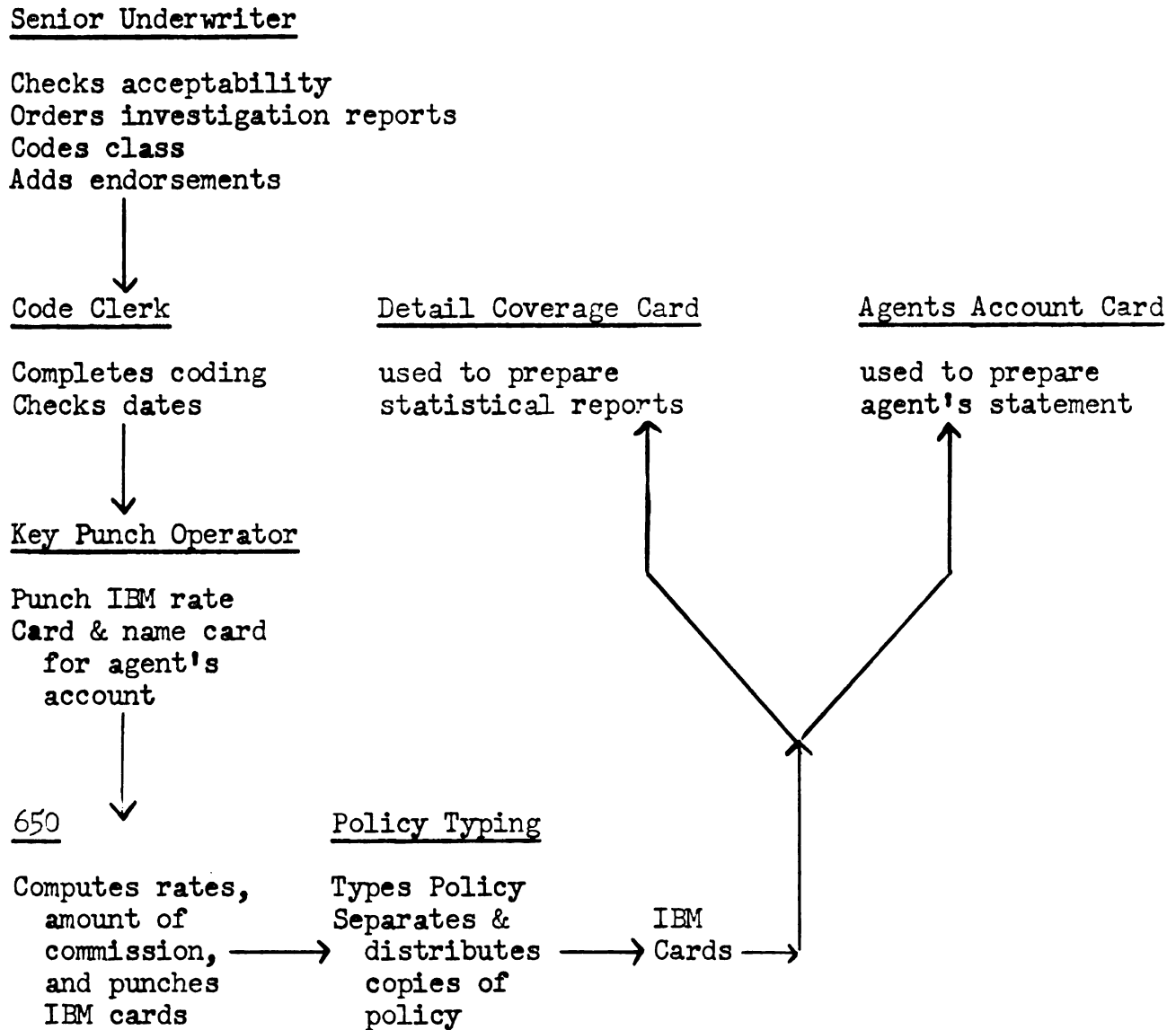


Fig. 1. IBM 650 computer generalized work flow for use in the insurance industry.

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Characteristics of the Experimental Population

The research design for this study called for both a pretest prior to the installation of the computer as well as a posttest sometime after its introduction. It was the intention of the research team to include as many persons from the home office and branch office in the survey as possible and practicable.

Because of problems of administration and the questionable involvement of part-time employees and those who spent more than half of their working time outside of the company offices (claims adjusters and agents, for example), these persons were excluded from the study.³

The fact that this was a longitudinal study meant that problems of experimental population mortality had to be dealt with. During the interim between pretest and posttest certain employees terminated their employment for one reason or another. For this group there were pretest responses, but no posttest results. The obverse of this was represented by the picking up of new hires. Again, during the period subsequent to the initial testing but antecedent to the posttesting the company took on new hires, or employees who had been sick or on vacation at the time of the first questionnaire administration returned to work. These circumstances meant that there were posttest questionnaire responses for some persons, but no corresponding pretest results. The solution to this problem was the dropping of all "terminals" and pick-ups" from the experimental population.

3. Members of the company's top management level did not participate in the study.

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Table 1.

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The original figures for the experimental site with respect to the population are reflected in Table 1 below.

Table 1. Total Population at Research Site Involved in Survey

Location	Level	Pretest Administration	Posttest Administration
Home Office	Supervisory	35	37
	Non-Supervisory	157	158
Branch Office	Supervisory	15	17
	Non-Supervisory	<u>76</u>	<u>83</u>
Totals		283	295

Table 1 includes all employees who took either or both of the questionnaires at the times of administration. In order to arrive at the "true" experimental population; i.e., those employees for whom responses to both pretest and posttest questionnaires were obtained, the "terminal" and the "pick-up" cases had to be subtracted out of the original total. Table 2 shows this corrective step in terms of an adjustment made to the original pretest and posttest populations. Such an adjustment meant that the total experimental population (N=246) contained individuals who responded to both the pretest and posttest forms of the questionnaire.

Table 2. Terminal and

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Table 2. Compensations to Experimental Population for Terminal and Pick-up Cases

Administration	Group Dropped	N	Original Population	Adjusted Population
Pretest	Terminals	37	283	246
Posttest	Pick-ups	49	295	246

In conjunction with this adjustment, the investigator examined the experimental population to determine its characteristics and composition. This information is enumerated in Table 3.

Table 3.

Characteri

Level

Supervisory

Non-Supervisory

Sex

Male

Female

Age

Under 29

Over 30

Education

At least high school

Some college or more

Tenure (Hire

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Table 3. Characteristics and Composition of the Survey Population

Characteristic	Home Office (N = 171)		Branch Office (N = 75)		Total (N = 246)	
	N	%	N	%	N	%
<u>Level</u>						
Supervisory	35	20.5	14	18.7	49	19.9
Non-Supervisory	136	79.5	61	81.3	197	80.1
<u>Sex</u>						
Male	41	24.0	11	14.7	52	21.1
Female	130	76.0	64	85.3	194	78.9
<u>Age</u>						
Under 29	91	53.2	57	76.0	148	60.2
Over 30	80	46.8	18	24.0	98	39.8
<u>Education</u>						
At least high school	133	77.8	59	78.7	192	78.0
Some college or more	38	22.2	16	21.3	54	22.0
<u>Tenure (Hire Date)</u>						
1952 or before	76	44.4	8	10.7	84	34.2
1953 or after	95	55.6	67	89.3	162	65.8

As one would normally expect in the case of an insurance company, the data reflects a preponderance of female workers as compared to male employees (78.9% versus 21.1% respectively). In this company the majority of the male employees functioned in some supervisory capacity.

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Additionally, the bulk of the employees were young (60.2% of the total were 29 years of age or younger). A significant proportion (65.8%) of the work force was made up of individuals who had been with the company since 1953. This means that at the time of our testing about sixty-six per cent of the personnel had been with the organization for four years or less.

Differences of some magnitude were found in two characteristics of the population when the home office group was compared to the branch office; i.e., age and tenure. Employees of the home office represented an older group of people than was found in the branch office (46.8% versus only 24.0% who were thirty years of age or older). The home office personnel had, percentage-wise, been with the company longer than workers in the branch office (44.4% of the home office people had been with the company since or before 1952, whereas only 10.7% of the branch office had been with the company that long).

To provide some indication of the average or mean differences between the home and branch office, table 4 was prepared.

Table 4. Means and Standard Deviations for Home and Branch Office Employees on Selected Characteristics

Characteristic	Inter- preted Mean	Obtained Mean	SD	Inter- preted Mean	Obtained Mean	SD	Inter- preted Mean	Obtained Mean	SD
Education(yrs.)	12.22	6.22	0.84	11.93	5.93	1.21	12.13	6.13	0.99
Age(yrs.)	32.43	32.43	12.16	25.44	25.44	8.61	30.29	30.29	11.83
Tenure(yrs.)	5.69	52.69	7.68	0.23	57.23	4.79	3.08	54.08	7.35

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The mean age for all employees was 30.29 years. The average amount of education was 12.13 years of schooling. The mean length of service with the company for all personnel was just over three years (Mn = 3.08). In the case of age, the standard deviations suggested that there was quite a bit of spread in this particular characteristic. Table 4 revealed that personnel in the home office, on the average, were slightly better educated, were older, and had been with the company quite a bit longer than their counterparts in the branch office.

The Communications Program

In order to prepare their employees for the impending installation of the IBM 650 computer, the management decided to launch a communications program. This program was designed to be implemented during the pre-installation time period. It was to serve the explicit purposes of providing information to employees about the IBM 650 equipment, how it operated, the planned use of the equipment, and the progress of the installation. It was also designed to allay fears, rumors, and anxieties about possible adverse effects of the computer; e.g., a reduction in the size of the work force through layoffs.

There was extensive discussion among company officials during the planning phase of the information program concerning what form the program should take, its timing, and content. A series of articles on the computer installation appeared in the monthly house organ, written by the internal auditor. In addition to the appearance of information in the house organ, other media were used. At various times bulletins were issued and information meetings were held.

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There were three memoranda issued by the president of the company. The first of these represented a formal announcement to all supervisory personnel on 17 April 1957 that an IBM 650 computer was to be installed. This memo also outlined in general terms the new responsibilities and personnel changes associated with the introduction of the computer. The other two memoranda, distributed to all personnel, brought attention to the fact that an attitude survey was going to be conducted, and indicated the times and places of administration. Such a memo was issued prior to both the pretest and the posttest. In the case of the former, it was accompanied by a letter to the employees from the L.I.R.C. explaining the survey. The reader may refer himself to Appendix E for copies of these bulletins.

On 20 July 1957 the first in a series of articles on the computer appeared in the company house organ. These articles were in the form of a series of progress reports to employees on the impending introduction of the IBM 650. The principle themes appeared to center around the fact that: 1) the company encouraged, and would be glad to answer, any questions which employees might have; 2) the computer would permit more rapid and accurate servicing of policies; 3) information would be collected on a more timely and accurate basis; and 4) no one need fear loss of employment because of the computer. The articles on the IBM 650 ran consecutively for five months (from 20 July 1957 to 25 November 1957). For the articles, the reader is referred to Appendix E. It should be noted in passing that the research team was informed that the monthly "magazine" was read with great interest by the employees.

With respect to orientation, information, and planning meetings which affected other than just the top echelon of company management,

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there were a total of six distinct meetings held. The first of these was conducted on 2 October 1957 for personnel of the IBM key punch and tab sections. The purpose of the meeting was to familiarize the people most likely to be affected by the changeover with the computer and its expected operation.

A meeting was held on 15 October 1957 which was attended by a number of the first line supervisors and management personnel. Its purpose was to review the progress made on plans for the installation, to discuss specific areas of utilization for the computer, and to settle certain questions regarding personnel.

The other four meetings represented separate sessions held in the home office to acquaint all employees with the installation of the IBM 650. All home office personnel attended one of the four sessions which were conducted on the same day, 11 November 1957. The four sessions were exactly the same. The branch office personnel were not involved in similar information meetings. These meetings included a formal talk by the company's programming supervisor about the computer and what it was expected to do. This was followed by a question and answer period. Available to the attendees were three hand-outs regarding the computer and how it operated. Copies of this material is found in Appendix E along with a transcript of the notes from the formal talk and a listing of the questions asked by employees in each of the four sessions.

A special IBM 650 demonstration was held for top management on 9 August 1957 at IBM's data processing center in the same city in which the branch office was located.

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The Questionnaire and its Administration

Beginning in April, 1957 a number of preliminary planning sessions were held between company officials and representatives of the L.I.R.C. to work out the details of the study. The research design called for both a pretest and posttest measurement. Since the computer was scheduled to be installed in December, 1957, it was decided to administer the pretest attitude questionnaires on 19 November 1957. The date of 20 May 1958 was set as the date for the posttest questionnaire administration. This temporal arrangement meant that there was an interim of six months between questionnaire administrations. The initial testing occurred approximately three weeks prior to the installation of the computer, and the final testing took place about five-and-one-half months after the computer was introduced.

The questionnaire was the result of the efforts of a research team to construct an instrument to assess employee attitudes on a number of issues. Research interests of the team members were different, and as a consequence the questionnaire presented a variegated appearance. The questionnaire provided basic data on such variables as employee perceptions of change, expectations about change, and attitudes toward change as a job-related phenomenon. In addition to these, there were sets of items and scales measuring such variables as supervisory practices, personality factors, job satisfaction, and group cohesiveness. The final page of the questionnaire requested personal data information such as age, tenure, education, salary, etc. The reader is referred to Appendix F for copies of the questionnaires.

The questionnaires used in the pretesting were in two forms: a supervisory form and a non-supervisory form. The supervisory form had a blue cover sheet to distinguish it from the non-supervisory form. Because some items were relevant only for supervisors, or for non-supervisors, and due to a difference in frame of reference ("my supervisor" versus "my subordinates") a differentiation between forms was required.

Beneath the blue cover sheet of the supervisory forms, and as the first cover page of the non-supervisory forms, was a letter from the L.I.R.C. This cover letter pointed out in very general terms the purpose of the study, the need for frank responses, and that respondent anonymity would be insured. At the bottom of this cover letter was a printed section designed to be torn off by the respondents after completion of the questionnaire. This strip of paper (called the "name ballot") contained the respondent's name and a pre-stamped code number. The face sheet had another stamped code number in the upper right-hand corner which corresponded to the number on the "name ballot." Upon departing the respondent deposited his questionnaire at one point and dropped his "name ballot" in a box. Only the research staff, in possession of both the questionnaires and "name ballots," could later match up the proper completed questionnaire with the correct "name ballot" by comparing code numbers. The company, of course, did not have access to this information, hence anonymity was assured.

The "before" questionnaire contained a total of thirty-seven pages, while the "after" form of the questionnaire contained seventeen pages. The disparity in size of pretest and posttest forms was primarily due to the fact that certain areas of information and classes of data did not

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In the home office the administration of the questionnaires was carried out in two separate sessions on the same day in the basement lunch-room. Seating was arranged so that there were four persons to a table. Supervisory personnel were asked to sit together in several rows so that they would be separated from the non-supervisory personnel.

When all personnel were assembled the questionnaires and pencils were distributed. Instructions were then read to them over a public address system set up for the occasion. These instructions are reproduced below:

"I am _____ of the Labor and Industrial Center at Michigan State University, and this is (these are) _____, _____, _____, from the Labor and Industrial Relations Center. I suppose that all of you received a letter from us recently explaining the purpose of this survey and a little bit about what we hope you can do for us today. As you know, the Labor and Industrial Relations Center at Michigan State is carrying on a broad program of research having to do with people working together effectively in industrial organizations. Much of this research consists of getting the ideas and opinions of people about their jobs. We are asking you to fill out a questionnaire for us as a part of the series of studies dealing with insurance company employees in the Midwest. Your answers, along with those from people in other organizations that we have already surveyed and will survey in the future, will be analyzed to help us discover what things are most important in making the working situation better for the people in it. We would like to emphasize the third and fourth paragraphs of the cover letter that you have on your questionnaire. The conclusions that we draw about your attitude and opinions will be of value only to the extent that they reflect your really frank opinions and attitudes. As you can see on the bottom of the face sheet, we are asking you for your name. This is essential to us in order to properly analyze the questionnaire, but your name and number will be re-coded immediately after the survey and positively no one other than the research workers at the Labor and Industrial Relations Center will ever be able in any way to identify you in connection with your answers. We absolutely guarantee that no one connected in any way with ----- will ever at any time be aware of how you answered the

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We will be available to answer questions that you may have once you have started answering the questionnaire. Be sure to answer every question. When you have finished, tear off the bottom half of the face sheet and place your name in the ballot box and your questionnaire in the large box at the door as you leave. You may begin."

After the instructions were read and the employees began working on their questionnaires, several administrators circulated among the respondents to assist in answering any questions which arose.

Two hours were allotted for each group to complete the questionnaire, most employees taking about an hour to finish. After the administration the "name ballots" were collected from their deposit box at the lunch-room exit. The names of respondents were checked off by a member of the research team against a revised, up-to-date company payroll list in order that a list of absentees could be compiled.

On the same day several members of the research team administered the questionnaire to branch office personnel. Because of space limitations at that location, employees took the questionnaire at their work desks. As a result only one session was required. The same administrative procedures, in general, were applied to branch office personnel as were used for the home office.

On the following day research team members visited both the home and branch offices in order to administer the questionnaires to those who had been absent or could not conveniently take the questionnaire at the regularly scheduled time.

Essentially the same procedures were followed at both the pretesting and posttesting administrations of the survey.

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Tabulation of Questionnaire Data

Each questionnaire was given a code number for identification purposes. The code numbers corresponded to the names of questionnaire respondents. Coding was done in such a way that all numbers up to and including 299⁴ represented individuals who had been involved in the first administration of the questionnaire.⁵ Code numbers 301 to 628⁶ were used to represent employees who took only the post-installation questionnaire.

All items comprising both the pre-installation and post-installation questionnaires were pre-coded and numbered in such a way so as to indicate the location of the item in a particular deck of IBM punch cards. The Roman numeral indicated the card deck and the Arabic numerals denoted the column or columns on the card where the response to the item was punched. For example, item II-16 signified that the response to this particular item could be found in card column 16 in deck II.

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4. The identification codes were assigned to the experimental sub-groups as follows:

Home office supervisors	= 1-46
Branch office supervisors	= 50-67
Home office non-supervisors	= 49, 68-223
Branch office non-supervisors	= 224-299

5. An exception to this was code numbers 39, 40, 45, 47, and 66; these represented individuals who took the posttest questionnaire, but not the pretest questionnaire.
6. These numbers did not run consecutively; there was some discontinuity because all questionnaires within this code range were not used in the survey.

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Space was allotted on the cards to enter a group code,⁷ the individual's identifying code number, the item score, total scores for scales or sets of items, and the number of non-responses.

Each alternate of the multiple-choice format attitude items was given a code number so that responses to these alternates could be entered by key punch onto IBM cards for storage, tabulation, and analysis. Open-ended items were treated differently. All answers to this type of item were fitted into some meaningful and convenient set of response categories for which code numbers were assigned to represent each category.

It should be noted that prototype items covering some of the content areas of the survey questionnaire were administered to a sample of M.S.U. Tabulating Department employees in November, 1956. The subsequent and substantial refinement, modification, and addition of items eventually led to the construction of an attitude questionnaire which was administered in an insurance company in February, 1957.⁸ This questionnaire, changed and altered to a considerable extent, formed the basic instrument used in the current investigation.

7. Home office supervisors = 4121
 Branch office supervisors = 4122
 Home office non-supervisors = 4111
 Branch office non-supervisors= 4121

8. For a discussion of this study, see Jacobson, et. al. (1959)

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CHAPTER FOUR

THE VARIABLES EXAMINED

In the latter part of the Introduction there was a cursory description of the variables to be examined in this study. This chapter will discuss the rationale behind the selection of the variables as well as provide definitions for them.

The Independent Variables

The influence of persuasive communications upon attitudes in terms of eliciting changes or shifts in these attitudes has been widely documented in the literature. Some principal workers in this area have been Hovland at Yale, Lazarsfeld at Columbia, and an active group at the University of Michigan, the latter's emphasis being upon communications in small groups.

When investigating employee response to change an important factor would seem to be intra-organizational communications. In a setting of change or of proposed change, communications become crucial from the standpoint that they function as a force to integrate, coordinate, and direct the work force in such a manner as to facilitate a smooth transition with a minimal degree of friction, resistance, and misunderstanding. A major purpose of formal intra-organizational communications is to establish, maintain, and perhaps eliminate or modify certain kinds of attitudes and expectations held by employees about a proposed change.

When an organization embarks upon the introduction of automated operations, a communications program becomes important in that it should provide for the transmission of the following kinds of information to

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employees: 1) procedural changes they will encounter on their jobs; 2) the purpose and reasons for the introduction of the automated equipment; 3) assurances regarding job security; 4) details of the change as to when and where it will take place, and 5) training programs, personnel changes, etc. which are prerequisites to the change.

The belief in the intrinsic importance of an information program of some sort as a precursor to a changeover was exemplified in the formal program initiated by the company in which this study was conducted. Management frequently believes on a priori grounds that the success in terms of employee acceptance of a proposed change hinges to an extent on the presence of an information program.

The assumption is made that resistance toward some job-associated change originates from an insufficient understanding of the changes. This kind of an assumption leads frequently to an increase in the flow of information directed to employees about the change. It is true, certainly, that once a proposed change has been agreed upon, increased communications can help employees better understand the change and the way in which it is expected to effect them.

In this particular instance, employees were informed about a proposed change once the decision was made by top management. There was very little to be seen of what has been termed "employee participation." In this context the formal communications program operated to inform employees of changes and decisions made by others. As Mann and Hoffman (1960) opine, a lack of understanding about some change may contribute to resistance to change, but perhaps this same lack contributes only very little to positive acceptance of a change.

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One function of information about a change, directly or indirectly, is to create a set or predisposition toward the object of the information. The psychological consequences of this process, if it is operative, is to structure expectations. This molding of expectancies is in turn eventually related to a reality-testing in the sense that there is an affirmation or negation of expectancies based upon empirical contact with the change. If one experiences something contrary to the expectations which were elicited by the information, then we may expect a future response to communications to be characterized by skepticism and even disbelief.

The investigation of formal company communications in a setting of change is seen as a potentially important issue. This is particularly true when such communications are viewed in relation to attitudes about proposed changes and to attitude modifications related to the change.

The research carried out was concerned with an empirical investigation of communications about a change, and with a specified response to the communications as both of these relate to attitudes about change. To what extent does the act of being informed or not being informed about a change affect employee attitudes about the changes they may perceive as taking place? Is there a relationship between one's reaction to the information contained in an information program about a change and the attitude toward the change itself? These were questions the present study attempted to answer.

The basic premise was that some dimension or dimensions of formal communications about a change ought to be important in producing mea-

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The independent variable was considered as being reflected in two separate entities. These were examined separately and were treated as two distinct independent variables. They are specifically discussed below.

Degree of Informed Awareness

As discussed in detail in the preceding chapter, prior to the installation of the IBM 650 computer the company initiated an information program about the computer for the benefit of its employees. This consisted of meetings, bulletins from the president of the firm, and a series of articles in the house organ.

From these media of formal communications a set of sixteen factual statements were drawn up. For example, "the computer cannot correct errors that exist in the data it receives," and "one of the immediate tasks of the 650 programmer is to develop a procedure for figuring payroll on the computer." The majority of these items correctly represented the information as directly extracted from the meetings, bulletins, and articles. Some items, however, were purposely incorrect. They were factually wrong and directly contrary to what the company had actually said, or they were manufactured in the sense that the company had not actually said anything on the topic.

The reader is referred to Appendix F for the instructions and original set of sixteen items used in the pretest form of the questionnaire. These items for both the supervisory and non-supervisory questionnaire are numbered III-44 through III-59 on pages 14 and 15.

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The format of this particular knowledge-of-information test represented a departure from those used in other studies. This test placed focus upon what the company had done in the way of communicating with its employees. Yet, by asking how the company had acted on the various statements, one also obtained a measure of the knowledge held about the change-over as mediated by the information program.

Certain key management officials were used as judges to ascertain, as a check on the experimenter, whether or not the company had in fact made or not made a statement, or had pronounced something contrary to the statement appearing in the questionnaire. Data on these comparisons is presented in a subsequent chapter. On the basis of these judgements, the sixteen information items were keyed in terms of what the company had actually done; i.e., made the statement, not made the statement, or said something opposite.

An important aspect of the company information program was that the tone of the formal statements was of a definitely positive nature. That is, the information pointed out that the impending change was very beneficial for the company and that there was to be no loss of jobs because of the computer's introduction.

In a naturalistic setting of the sort in which this study was conducted the experimental subjects, except in the case of required attendance at various meetings, exposed themselves on a voluntary basis to formal communications rather than being fully exposed through control.¹

1. Hovland (1959) refers to this phenomenon as "self-selection of exposure" to communications.

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With respect to the temporal relation existing between the formal communications program and the administration of the knowledge test, the information meetings for home office personnel were held seven days before the questionnaire administration. A total of four articles appeared consecutively in the company's monthly "magazine" before the pretest. The fourth appeared about four weeks prior to the questionnaire.

The information test, from which the Degree of Informed Awareness was derived, represented the agreement between what management said it had told its employees and what the employees said the company had told them regarding the changeover. In this sense, the scale actually was the amount of congruence between respondents' opinions and those of management representatives as to what information had been transmitted to the employees.

The definition for this independent variable shall be: the "degree of informed awareness" is the extent to which designated recipients of formal company communications are aware of specific factual pronouncements made by the company regarding the installation of the IBM 650. This degree of awareness of factual information was taken as equated to the degree to which these recipients were personally informed about the impending change.

The definition does not exclude the use of this measure as one of communication effectiveness.

Belief-Disbelief in Communications

The second independent variable was essentially an extension of the first. As a derivation, it could be considered a component of

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Degree of Informed Awareness.

It was reasoned that, although the amount of factual information one may know about an impending change may be related to attitudes regarding that change, it was also a good possibility that one's attitudes toward the communications themselves would be related to consequent attitudes about the change. This attitude toward the communications was specified in terms of a dimension of acceptance (belief) - rejection (disbelief) of the information contained in the communication.

A set of eight items were written as companion items to a corresponding set of eight items in the information test. The items comprising the belief-disbelief measure appeared in the questionnaire immediately following the information test. The reader may refer to Appendix F where these items, numbered III-60 through III-67, are found on page 16 of both the supervisory and non-supervisory forms. This set of items was prefaced with the instructions:

"Now we would like to know what you personally think will happen as a result of the computer. Below are several questions. Mark your answer in one of the columns 'yes', 'possibly', and 'no', depending on your opinion."

In reality, then, one was dealing with eight pairs of items. For example, from the information test we have: "The company will be able to issue policies more quickly thanks to the computer." - the respondent indicating if the company had said so, said the opposite, or had remained silent on that topic. Then, from the belief-disbelief test, "In your opinion, will the company be able to issue policies more quickly thanks to the computer?" - the respondent indicating 'yes', 'possibly', or 'no'.

As will be discussed in greater detail in a later chapter, a weighted scoring system was devised for these eight pairs of items. This scoring scheme was designed to reflect the extent to which an individual's expectations or beliefs about an impending change deviated from management's belief on various issues regarding the forthcoming computer installation. For example, if the company said it would be able to issue policies more quickly, and the employee agreed that the company said this, but personally indicated that the computer would not make policy issuance more rapid, then disbelief was registered for this particular item of information. Of course, if the employee believed or expected that this would occur, then belief in the company's pronouncement was indicated. A system of assigning varying positive or negative weights was used to score combinations of responses on the eight pairs of items in such a fashion as to reflect degrees of belief-disbelief in company statements in conjunction with whether or not the respondent was aware that the company had made or had not made the statement originally.

The definition for this second independent variable, "Belief-Disbelief in Communications", shall be: the degree to which an employee's expectancies or beliefs about an issue deviate from management's belief on the same issue as expressed through formal "in-plant" communications. This variable was reflective of a general readiness on the part of employees to accept, or inclination to reject, what they were told by the company.

Since a communications program can be considered as a means, either implicit or explicit, for structuring employee expectations regarding

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the object of the communications, one could suggest, with regard to Belief-Disbelief in Communications, that this was also a measure of the degree to which the communications program had succeeded or failed in structuring expectations about the change. At any rate it was indicative of the agreement or disparity between management and employee expectations about the impact of the IBM 650 upon company operations.

There was certainly some reason to expect on logical grounds, that belief-disbelief in what the company said was one facet or component of some hypothetical general factor one might term "confidence in the company." It may also be indicative of general job satisfaction and "morale."

The Dependent Variables

A central integrating theme in the series of investigations of which this study was a part, has been the exploration of various psychological responses to technological change. Chapter Two pointed out that the classical approach to the study of employee response to change had been primarily centered around the phenomenon of resistance to change. The emphasis followed here has been more global and encompassing in approach - and hopefully more fruitful. In this series of studies the focus has been on the perceptions, expectations, and attitudes related to job-associated changes, the agent for the change, and the effects of the change.

This investigation was concerned with response to change as the dependent variable. As with the independent variable, it was decided to include two factors to be treated as two distinct dependent variables.

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Although one was not derived from the other, both represented forms of response to change. One dependent variable had a general referent and represented a change over time, while the other had a specific referent and represented a condition at one point in time.

A specific response to change, either to the effects of the change or to the agent producing the change, is taken here as representing a differential condition arising out of reactions to some alteration or set of alterations consequent to exposure to a specified change in a specified situation. At a theoretical level, a response to a specified change can be seen as a partial conditioner of future responses to change depending upon: 1) a gradient of generalization linking the changes as common in some aspects, 2) the characteristics of the original response to a change (highly positive or negative, neutral, stable or unstable), 3) the effects of the change upon the individual in terms of either positively or negatively reinforcing the response made to it, 4) personality factors resident within the individual, 5) perceptions of the way in which the changes were handled in the past and are likely to be handled in the future, 6) interim factors of an unspecified, unknown nature, and 7) the perceived consequences of the changes.

With regard to general response to change we are dealing with a generalized predisposition to accept changes or to maintain the "status quo." This is differentiated from a specific response to change by the degree of influence exerted by the process of selectivity. In the latter instance (specific changes), they are reacted to on a selective basis - some are responded to in a positive manner while others are

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reacted to negatively and some are met with impassiveness depending upon the perceived implications of the change for the individual and his involvement in the change. In the former (general changes), the individual maintains an attitudinal set towards change as a class of events - either they are inherently beneficial or they are on the whole disruptive and inevitably lead to difficulties. In general response to change it is reasonable to suppose that the individual may easily tolerate minor and relatively insignificant changes, but will resist changes of a major proportion. Certainly personality attributes are an important factor in this instance as well as past experience.

The interaction between specific and general response to change cannot be overlooked. It is just as valid to assume that a constellation of specific changes, and the resultant response to them gives rise to a general readiness to accept or reject change, as to assume that a generalized acceptance or rejection of change dictates specific responses to specified changes.

It is reasonable to assume, though, that one certainly influences the other to the extent that a generalized readiness to accept changes in one's "life-space" is accompanied by, on the whole numerically, more positive responses to specific changes. The obverse would hold in that a generalized unwillingness to accept changes conceptually is often associated with a greater frequency of negative responses to specific changes.

Another factor which theoretically at least would appear cogent is that connected with controllability. The individual should perceive changes in a more favorable light when he is in a position to exert

control over or influence the course of a change. The greater one's control over his environment, either factually or imagined, the less likely will changes in general be perceived as representing a potential threat to the person. This, it would seem, is one of the major reasons why "participatory management" has been successful in combating and reducing resistance to change.

Readiness to Accept Change

This particular dependent variable represented an attitude of generalized readiness to accept job-related changes of an unspecific nature. It also reflected an opposition or resistance to accept unspecified but job-related changes. This variable, and the scale from which it was derived, has been used in previous studies.²

In this particular investigation a measure of the general readiness to accept job related changes was obtained through the use of a nine-item scale which was administered in both the pretest and posttest questionnaires. The reader is referred to Appendix F for these items. On the pretest form for both supervisors and non-supervisors this scale is represented by item I-56 on page 4 and by items IV-40 through IV-47 on pages 17 and 18. On the posttest form of the questionnaire the items are III-16 on page 13 and items I-39 through I-46 on pages 4 and 5.

The actual variable measure utilized in this investigation is defined as: a shift or change in the general readiness to accept job

2. The reader is referred to Trumbo (1958) and Faunce (1960).

related changes over time in terms of pretest and posttest discrepancies on the nine-item scale. This shift in general readiness to accept change was measured on dimensions of both direction and magnitude. Experimental subjects could thus be categorized as becoming more or less ready, or remaining static, in their general acceptance of job-connected changes over a six month period of time. It was during this six month period that the computer was installed. The static group represented some who were eager to accept changes and remained so, those who abhorred changes and continued to feel that way, and those who fell at intermediate points and did not shift from pretesting to posttesting in their positions.

Affective Response to the Computer

Besides having a measure of a more generalized, global response to change, it was reasoned that another important kind of response certainly would be that associated directly with the introduction of the computer. A set of three items was selected from the pretest form of the questionnaire that represented an affective response (on a like-dislike continuum) to the expected effects of the computer. These three items were the second component in a set of three pairs of items. The first item in each pair asked, respectively:

- 1) "Which statement best describes the effect you expect the computer to have on you in the next six months?"
- 2) "Do you think that the computer will influence your job in the next year or two?"
- 3) "What is your general feeling about the fact that the company has decided to install the computer?"

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Each of these items was followed by the same item asking, "How do you feel about this?" It was this latter triad of items which were utilized as a measure of Affective Response to the Computer. The reader is referred to Appendix F where these items can be found numbered II-52, II-54, and II-55 on pages 10 and 11 in both the supervisory and non-supervisory forms.

In the case of items II-52 and II-54, like or dislike responses were used in a fashion independent of the expected effects of the computer. In other words, employees may have indicated a liking for some expected effect or they may have indicated a liking because their expectations led them to believe that the computer would have no effect upon them. In both cases the respondent liked³ the effect of the computer. The "effect" in this sense phenomenologically was expressed by: it will or will not have some expected impact upon me as a worker in this company. Psychologically, then, the presence of an expected impact on the worker or absence of expected impact were both effects of the computer's introduction.

The definition, then, for this variable is: the affective response toward the computer and the expected effects upon the employee.

The Intervening or Secondary Variables

During the course of investigating and exploring hypothesized relationships obtaining between independent and dependent variables, it seemed of some importance to become cognizant of and control if possible

3. A similar case may be drawn for respondents who report dislike or indifference to the expected effects of the computer.

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the effects of various secondary factors. These factors represented "extraneous" variables in the sense that they were intrinsic to the experimental setting, were variously related to the experimental variables, and were not amenable to experimental control. It was seen as important to, in some manner, account for their effects, when statistically examining specific relationships between the independent and dependent variables. There was the possibility that the uncontrolled effects of these secondary variables could act to either mask or artificially produce relationships between the main variables - in either event distorting the "true" relationship obtaining between these experimental variables.

Two specific problems at once arose: first, how can one isolate and identify the secondary variables whose effects should be controlled for, and secondly, how should one achieve this control. Both call for certain statistical operations which will be recounted in a later chapter.

On an a priori basis it was possible to arrive at a list of so-called intervening or secondary variables which might potentially affect any of the main variables.

Since there was no way of knowing in advance which secondary variables were significantly related to the main variables, a series of initial screening analyses were performed and are reported in chapter 8.

The a priori list of potentially significant secondary variables consisted of the following:

1. Age
2. Education
3. Tenure
4. Occupational level (supervisor or
non-supervisor)
5. Office (home or branch)
6. Expected involvement in the change

7. Number of contacts with formal communications
8. Supervisory style
9. Realization of expectations

At this point suffice it to say that, of these variables, subsequent analyses proved: perceived involvement, occupational level, office, and contacts with communications were significantly related to one or more of the main experimental variables. Each of these secondary variables will be identified more specifically.

Expected Involvement

This indicated what employees expected to happen to their jobs because of the computer. One may expect no changes, some changes, drastic alterations, transfer, promotion, etc. resulting from the installation of the computer. Subjects were categorized, on the basis of their responses, into those who thought they would be greatly affected, those who expected negligible or no involvement, or those who had no idea. The item was II-51 on page 10 of both the supervisory and non-supervisory forms of the questionnaire. It is reproduced below:

"Which statement best describes the effect you expect the computer to have on you in the next six months?"

- _____ 1. I expect to be promoted
- _____ 2. I expect to be transferred to a different job.
- _____ 3. I expect to keep the same job, but with the work greatly changed.
- _____ 4. I expect to keep the same job, but with work noticeably changed.
- _____ 5. I expect to keep the same job with the work only slightly changed.
- _____ 6. I expect to keep the same job with no change at all.
- _____ 7. I don't expect to be affected for I plan to quit.
- _____ 8. Other (describe) _____
- _____ 9. I have no idea."

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A response to alternates 1, 2, 3, and 4 placed the individual in the "expect change" group, a response to alternates 5, 6, and 7 represented the "expecting no change" group and a response to 8 or 9 placed the respondent in a third group. If a respondent, by his response to alternate 8, indicated an expected effect, then he was placed in the group expecting a change of some sort. Thus there were, for analytical purposes, three groups:

- Group I - Respondent expects a major change
- Group II - Respondent expects only a slight change or no change
- Group III - Respondent has no idea

Occupational level

This secondary variable indicated whether or not the respondent was a supervisor or functioned in a non-supervisory capacity. The company personnel department provided identification information on this matter. In addition, when the questionnaires were administered, supervisors were requested to sit as a group separate from non-supervisory personnel, and they received distinctively different forms of the questionnaire. Thirdly, all employees were asked in question X-10, 11 on page 36, "What is your present job title?"

Office

This variable merely referred to whether the respondent worked in the home office or in the branch office.

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13 October 1953

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15 November 1953

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contacts which employees had with formal company communications that dealt with the IBM 650 computer installation.

The company provided the experimenter with copies of all bulletins, memos, and issues of the house organ which were distributed to employees. In addition to this material, a resume' of the content of information meetings and a listing of all personnel attending these meetings were provided.

Below in Table 5 is a summarization of the communications to which employees were exposed in prelude to the introduction of the IBM 650.

Table 5. Exposures to Formal Company Communications Concerning the Installation of the IBM 650 Computer

Communication Media	Location and Level			
	Home Office		Branch Office	
	Super- visory	Non-Super- visory	Super- visory	Non-Super- visory
<u>House organ</u>				
20 July 1957	* ^a	*	*	*
20 August 1957	*	*	*	*
20 September 1957	*	*	*	*
24 October 1957	*	*	*	*
<u>Meetings</u>				
2 October 1957	*	*		
15 October 1957	*	*		
11 November 1957	*	*		
<u>Bulletins</u>				
17 April 1957	*		*	
15 November 1957	*	*	*	*

^aThe entry (*) indicates an exposure to the particular communication for a specific location and level.

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An index of contacts was prepared based upon actual or likely exposure to the various formal communications. For each employee, every opportunity for exposure to formal information about the installation of the computer was given the value of one. These values were cumulative, being based upon the total number of presumed or actual contacts with formal sources of information. As Table 5 above indicates the total number of contacts for supervisors could have ranged from none to nine, while the total number of contacts for non-supervisory personnel could have theoretically ranged from none to eight.

The Constellation of Variables in Perspective

Partly because this investigation was of an exploratory nature, and partly because it was conducted within a naturalistic, largely uncontrolled setting, the context may be described as an open system wherein a conglomerate of variables were interrelated to unknown extents. Dealing with relationships in such a setting often proves difficult because of the multiplicity of inter-meshed factors. Where a constellation of interacting and uncontrolled variables exists, the nominal assignment of "dependent," "independent," and "intervening" to variables is somewhat arbitrary. For the purposes of interpretation and understanding however, one must relegate variables to one of these three classes. This is generally done on the basis of: 1) prior research findings, 2) a certain theoretical position, and 3) purely a priori hypotheses.

Within such a constellation of interacting variables it is somewhat a matter of choice which ones are called independent, dependent, and intervening simply because, depending on the relationship focused upon

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many of the variables could reasonably function interchangeably; at one time being the dependent variable and at still another time functioning as an independent variable. A direct consequence of this state of affairs is the relative safety (interpretatively) in speaking of concomitance and covariation between sets of variables, but the relative danger in pointing out cause-and-effect relationships between selected factors.

With these notes of caution, the dependent, independent, and intervening variables were selected as discussed in this chapter. In the following chapter we shall look explicitly at the relationships posited to exist between the main variables.

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CHAPTER FIVE

THE HYPOTHESES

This chapter will outline the major hypotheses tested in this particular study. As was pointed out in the preceding chapter, there were two distinct independent variables as well as two separate dependent variables. Such a configuration led to the establishment of four major postulated relationships.

In addition to the hypothesized relationships between the main variables, there were a number of sub-hypotheses constructed for the purpose of characterizing expected relationships between the intervening variables and certain of the main variables. This set of sub-hypotheses formed the rationale for the a priori selection of a number of secondary factors which later were subjected to empirical analysis to ascertain their relevancy.

The Main Hypotheses

It was reasoned that differential response to change and readiness to accept changes in one's job were partially influenced or conditioned by the degree to which one was factually informed about the proposed change. The general expectancy regarding this assumption can be expressed by: the better informed one is about a change, the greater the likelihood that the response to that change will be positive; the more poorly one is informed about a change, the more likely a response will be either neutral or negative. This kind of relationship would be markedly affected by the extent to which the information was couched in

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There were several reasons why the above general relationship would be expected. Firstly, being informed about a change can be thought of as reflecting the act of self-preparation for the change. One who makes efforts to become relatively well prepared for some change-over is perhaps less likely to manifest resistance to that change. This preparedness may be the result of positive expectancies about the change, or may be derived from the insight that a realistic adjustment is required.

Secondly, the way in which events are interpreted when they occur is frequently determined by the way in which the individual was prepared for the event.¹ Thus, positive preparation in the form of providing factual information which points out the benefits and positive aspects of a change should be related to positive reactions toward the change. The reverse, of course, would also hold true.

There is a third factor which would lead one to posit a relationship between the informative level of employees with regards to a change and their concurrent or subsequent attitudes toward the change. As Haire (1956) discussed with respect to communications in business, the mechanism of perceptual defense operates in such a fashion as to cause

1. Hovland (1951) pointed out that preparatory communications which build up optimistic opinions might have the effect of making people more resistant to accepting the implications of bad news. However, when people have been influenced by a preparatory communication containing optimistic arguments that are subsequently shown to be unfounded, the "bad" news might be all the more influential.

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people to select information which: 1) presents facts in harmony with the current views and beliefs of the individual, 2) presents that which is in agreement with currently held factual information, and 3) presents facts which are already fairly well understood. To this degree, then, those who are well informed about a change are also likely to be the ones who would respond with favor toward the change. Again, the likelihood of such a coexistence is enhanced by the fact that the communications were themselves of a positive nature.

These arguments have to some extent supported and led to formulation of the following two major hypotheses:

I The extent or degree of informed awareness on the part of an employee about a change will be related in a positive manner to an increase in general readiness to accept job-related changes over a period of time.

II The extent or degree of informed awareness on the part of an employee about a change will be related in a positive manner to the specific affective response to the computer prior to its installation.

The second set of major hypotheses are intimately linked with the first two in that the same dependent variables are of concern, and the independent variable is a reaction to the content of formal communications.

It has already been sufficiently stressed that the internal information program of the company was, primarily, of a positive sort indicating benefits to be accrued and rejecting any really adverse effects

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upon the work force resulting from the installation of the computer. It would seem almost axiomatic, then, that belief in what the company said would be analogous to positive expectancies regarding the change, and disbelief in factual statements would be equivalent to negative expectations about the effects of the computer introduction. It was on this basis, partially, that two other hypotheses were constructed.

Another consideration given to this relationship of belief-disbelief and responses to change concerned the fact that, in all probability, acceptance or rejection of company information was related rather closely to one's general regard for his company. This may manifest itself in confidence in what the company does, general job satisfaction, and/or what one may refer to as "morale." If one believes what the company says in terms of generally trusting the validity of its pronouncements, then it is likely that this trust is associated with a personal belief that the kinds of changes the management decides upon are, from an overall standpoint, ones which are for the "good" of the company and its employees.

As Baumgartel (1954) indicated in his discussion of perceived change and its measurement, the more favorable a person's attitude about some given object or situation, the more likely will the person also tend to perceive positive changes in that object or situation. In this study we may consider belief in company pronouncements about the changeover to the IBM 650 as representing a relatively positive attitude toward the computer. Hence, expressed belief in these management-initiated statements was hypothesized to be positively related to actual responses toward the computer and toward general

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In another instance Nilsen (1954), doing some research into communication problems existent in office and factory situations, isolated factors he termed "ego-reducing." These were: failure to be kept informed, not receiving recognition for work done, and not being told why something had to be done. "Ego-reduced" employees reacted by distrusting information and by reduced motivation to understand the information actually received. In our context we could perhaps expect to have some of these "ego-reduced" employees. They would make their presence known by high "disbelief scores." It is also likely that they would respond to expected changes in a negative way.

The two hypotheses relating belief-disbelief in company statements and responses to change are indicated below:

III The belief or disbelief in company-initiated pronouncements about proposed changes will be related in a positive manner to an increase in general readiness to accept job-related changes over a period of time.

IV The belief or disbelief in company-initiated pronouncements about proposed changes will be related in a positive manner to the specific affective response to the computer prior to its installation.

The Sub-hypotheses

There were a number of secondary hypotheses which specified the relationships expected between the intervening variables and the main

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experimental variables. These sub-hypotheses formed the rational basis upon which the original selection of intervening variables was made:

1. Age

It was expected that age would play some part in shaping responses to change. In the experimental setting the majority of employees were young women (78.9%). Their attachment to the job and longevity in the work situation were limited, certainly, but at the same time they were the one's who most likely stood to have their jobs altered by the computer's introduction. It was known that some job layoff rumors had been circulating. It was reasonable to expect that the younger employees felt that they would be the ones "replaced" by the computer if such layoffs actually materialized.

Older workers, in general, were holding more responsible positions, were in higher level jobs, and had some sort of job security associated with tenure. Hence, the following two sub-hypotheses were formulated.

1.1 There will be an inverse relationship between employee chronological age and resistance to change as expressed in an increase in the general readiness to accept job-related change.

1.2 There will be an inverse relationship between employee chronological age and resistance to the change as expressed in specific affective response to the computer prior to its installation.

2. Education

It was reasoned that education would have some effect upon responses to change. The better educated employee generally possesses a better understanding of the potential of business computers, and per-

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ceives such innovations as beneficial. The employees with a higher education also, generally, occupy supervisory positions and have positions of greater responsibility. On the other hand, the young workers are at lower levels, performing routine tasks which could conceivably be taken over by a computer. In addition, less educated employees are not as well informed regarding industry usage and experience with office automation - in a sense they are intellectually unprepared for automation. Those with less education, as a group, probably are more likely to perceive a tenuous grasp on their positions within the labor market. For these assorted reasons the following were hypothesized:

2.1 Employee educational level will be related in a positive manner to an increase in the general readiness to accept job-related changes.

2.2 Employee educational level will be related in a positive manner to the specific affective response to the computer prior to its installation.

2.3 Employee educational level will be related in a positive direction to the degree of informed awareness about the introduction of a computer into the company.

3. Office

Whether or not the employee was located in either the home or the branch office was, on an a priori basis, thought to be related to both the amount of factual information held about the computer changeover and also to the degree of belief in what the company said about the

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changes. A frequently observed phenomena concerns itself with the "branch-office syndrome" wherein there is mistrust of what the home office does, lack of understanding into motivations behind corporate decisions, a perception of being left out, and other problems of communications. It was a fact that the branch office encompassed in this study was not involved in information meetings, nor did the company management expect the branch office to be involved in the computer change for some time. On this basis the following were expected:

3.1 Home office personnel would be better informed about the installation of the computer than would branch office employees.

3.2 Home office personnel would have higher "belief" scores than would branch office employees where the referent for belief was company-initiated communications about the computer's introduction.

3.3 Home and branch offices would differ in the amount of change in expressed response to change.

4. Level

Being a supervisor, or functioning in a non-supervisory capacity, was seen as possibly exerting some influence upon both dependent variables and both independent variables. The individual who is a supervisor, because he is a part of company management, is more likely to be a primary recipient of information regarding the change-over, and to believe what he is told. In addition he would be more likely to perceive company implemented changes as positive advancements with fewer adverse effects than would be the case with non-supervisory personnel. The supervisors, in opposition to non-supervisory personnel, are less likely to perceive their jobs threatened as a result of the

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computer. In fact, some stand to gain status by its introduction. It is not absurd to expect that some supervisors' jobs will actually be made simpler by the installation of a computer. Thus, several hypotheses have been formulated based upon the above discussion:

4.1 Occupational level is directly related to the degree of informed awareness. Supervisors will be better informed about the change than will non-supervisory personnel.

4.2 Occupational level is directly related to belief-disbelief in company pronouncements. Supervisors will be more accepting of company pronouncements whereas non-supervisors will be more skeptical (less believing) of company information.

4.3 Occupational level is directly related to general response to change. Supervisors will, over time, show a greater increase in their general acceptance of job-related changes than will non-supervisory personnel.

4.4 Occupational level is directly related to specific response to change. Supervisors will reflect more favorable affective responses toward the expected introduction of the computer than will non-supervisory personnel.

5. Perceived Involvement of an Expected Nature

It is reasoned that those who expect some sort of a personal change in their job as a result of the computer will be predisposed toward being more critical in their attitudes towards the computer. This same group is also predisposed toward preparing for the change by accumulating information, and being relatively more attentive to the content of an

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information program regarding the installation of the IBM 650. Those who do not expect to be involved in the change-over actually have no reason to harbor negative attitudes about the effects of the computer. Rather, they should respond in either an impassive or positive manner. On the other hand, within the group of people whose expectations lead them to believe that the change will affect their jobs, some will expect effects of a detrimental nature. The hypotheses below were developed:

5.1 The expected degree of involvement in the changeover to the computer is related in a positive fashion to the degree of informed awareness.

5.2 The expected degree of involvement in the changeover to the computer will be directly related to the specific response to the expected effects of the computer.

6. Contacts with Sources of Communications

In this instance it was hypothesized that the number of contacts employees could be expected to have had with discrete information sources regarding the introduction of the IBM 650 would bear some relation to how well these people were informed and to their acceptance of the information received. Also, the more contacts one has with sources of information the more likely will his resultant attitudes toward the change be positive. The successive communications, which discussed the change in a positive vein, should reinforce one another. Those having relatively the greatest number of contacts would also probably be the ones to perceive themselves more central to the changeover and better informed. The specific hypotheses were:

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6.1 There will be a direct and positive relationship between the number of communicative contacts and the degree of informed awareness.

6.2 There will be a direct and positive relationship between the number of communicative contacts and the degree of belief in factual information received with respect to the IBM 650 introduction.

6.3 There will be a direct and positive relationship between the number of communicative contacts and an increase in the general readiness to accept job-related changes.

6.4 There will be a direct and positive relationship between communicative contacts and the specific affective response to the computer prior to its installation.

7. Tenure

The case with tenure is much the same as with age. The longer one has been with the organization the more likely they occupy a position of responsibility at a supervisory level. They are more likely to be more deeply attached to the company, and less likely to fear adverse effects in their jobs as a result of the computer. The sub-hypotheses were:

7.1 Tenure will be positively related to an increase in the general readiness to accept job-related changes.

7.2 Tenure will be related in a positive manner to the specific affective response to the computer prior to its installation.

Subsidiary Variables

Several secondary variables were chosen on an a priori basis for examination with specific independent variables. These are discussed

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8. Supervisory Style

It was thought possible that supervisory style could influence the extent to which employees were informed about changes. Although the amount of knowledge about the changeover was predicated upon contacts with formalized sources of information, it was plausible that a human relations oriented supervisor² would do more to keep his subordinates informed than would non-human relations oriented supervisors. It was hypothesized that:

8.1 Those perceiving their supervisors as human relations oriented will obtain higher scores on the Degree of Informed Awareness scale than will the employees seeing their supervisors as non-human relations oriented.

9. Realization of Expectations

The extent to which expectations were perceived as being met or realized over time was believed to be related to one's belief or disbelief in communications. Expectations took the form of expected changes (an increase, decrease, or no change) in specific aspects of the job. Subsequent perceptions of what changes had actually taken place were indicative of the extent to which expectations were met. Those who were either very high or very low believers would see less of their expectations met than would employees who exercised discrimination in what they believed. The hypothesis arising out of this, was:

2. For a discussion of this variable and its measurement, see Trumbo (1958). A human relations style was equivalent to democratic and ideocratic practices, while a non-human relations style was characterized by bureaucratic and autocratic practices.

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9.1 There will be a relationship between Belief-Disbelief in Communications and Realization of Expectations such that the extremes on the "BD" scale will reflect less realization of expectations than will the group of employees scoring in an intermediate range on the "BD" scale.

CHAPTER SIX

MEASURING THE INDEPENDENT VARIABLES

In Chapter Four the main variables as well as secondary factors were described from a conceptual standpoint. In this chapter the independent variables will be treated in terms of the means by which they were empirically measured and on the basis of the statistical characteristics of the measuring instruments themselves.

Degree of Informed Awareness

This particular independent variable was defined as: the extent to which designated recipients of formal company communications are aware of specific factual pronouncements made by the company regarding the installation of the IBM 650 computer.

Selection of Items and Construction of the Scale

An initial set of sixteen statements were written. These items were constructed to conform to three conditions of communicating: 1) a particular fact had been communicated, 2) a particular fact had not been communicated, or 3) a particular fact was diametrically opposed to what had actually been communicated. Each statement had three response categories, "The company has: said so, said the opposite, said nothing about the subject."

All formal written internal communications concerning the computer installation were collected and scanned for statements of a factual nature. From the monthly house organ, bulletins, and information meetings a set of six statements were drawn up which accurately portrayed

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With a background of accumulated information actually distributed to employees during the course of the communications program, it was possible to create synthetic "factual statements" which were opposite in nature to what had actually been transmitted. There were four items of this type. It was also possible to manufacture a set of six statements, the subject matter of which had not been dealt with by the company in explicit form.

Below in Table 6 is a resume¹ of the Degree of Informed Awareness items identified by their status as factually transmitted information.

Table 6. Factual Status of Items comprising "Degree-Informed" Scale

<u>Factual Status of Statements</u>		
Company Made the Statement	Company Said the Opposite	Company Said Noth- ing on the Subject
III-44 ^a	III-47	III-46
III-45	III-49	III-48
III-50	III-51	III-54
III-52	III-53	III-56
III-55		III-57
III-59		III-58

^aEntries are item numbers from the scale.

Such a categorization of items provided a first-approximation basis for establishing a scoring system. Individual responses could be compared to the experimenter's evaluation of each item as to whether or not the statement had been made, or whether the statement was opposite to the presented facts.

The set of sixteen items in all were included in the pretest form of the questionnaire.

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Upon receipt of the completed questionnaires, the results for a selected group of supervisors were examined in order to ascertain the extent to which this group's judgements agreed with the experimenter's with respect to the factual status of information test items.

The selection of a group of management personnel was made on the basis that these were the individuals who had been most intimately concerned with either or both the introduction of the computer and the information program. Their selection was premised further upon the assumption that the raters as a group possessed very similar or identical kinds of valid information about the changeover. This reservoir of information was brought to bear when they responded to the items in the "Degree-Informed" scale.

The following list provides a description of the positions held by each of the "judges" within the company:

Judge number 1	Internal Auditor
2	Treasurer
3	Programming Supervisor
4	Personnel Manager
5	Director of Training
6	Manager, Underwriting Department
7	Manager, Claims Department
8	Assistant Programmer

This select group, then, represented raters who "judged" the factual status of the information statements in terms of their reaction to the item response categories. Their "judgements" were then compared to the initial categorization of items as originally made by the experimenter. Gross discrepancies between this group of management "judges" and the experimenter in the manner in which items were responded to, resulted in particular items being discarded from further

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The degree of inter-rater agreement was determined in order to provide data on the reliability of the judgements made by this selected group of management personnel.

In the process of comparing cognizant management responses with the a priori categories of response established by the experimenter, an arbitrary level of at least 80 per cent agreement was set. This agreement referred to the number of judges responding, for a particular item, in like fashion as compared to the total number of judges being utilized. Since the manner of response was dictated by the experimenter's original selection of a "correct" response for each item, this comparison indicated how many judges, in effect, agreed with the way the experimenter classified each item as to factual status. Using 80 per cent as a cut-off point, five items were thus eliminated.

For the eleven items retained, the percentage of agreement ranged from 80 to 100 per cent, and for the five items deleted the agreement percentage ranged from 50 to 75 per cent.

In Table 7 is presented the results of an intraclass correlation¹ used to establish the reliability for the mean ratings on the retained eleven items in the "Degree-Informed" scale for the eight raters. This represented an estimate of the average intercorrelation between ratings.

1. For a discussion of this technique, see Guilford (1954, pp. 395-397).

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Table 7. Intraclass Correlation between Ratings on 11 Items for 8 Judges on the "Degree-Informed" Scale

Source	Sum of Squares	df	Variance	r_{kk}
Items	48.82	10	4.88	
Raters	1.89	7		
Remainder	15.73	70	0.22	.95 ^b
Total	66.44	87 ^a		

^aDegrees of freedom (df) based on an item-rater matrix of 11x8. Total df = 88-1.

^bThe intraclass correlation based on Ebel's formula; see Appendix D.

The results of the intraclass correlation indicated that the degree of reliability associated with the ratings was satisfactorily high ($r_{kk} = .95$). As a result of these comparisons and ratings, a scale of eleven items was used to measure the degree of informed awareness.

Scoring Schema

It was the objective here to obtain a score which would reflect placement along a linear scale or continuum of acquisition-retention of specific information distributed by the company about the introduction of the computer. The score should be such that it would permit comparative statements of a reliable nature to be made about particular persons being better or less well informed than others.

The method for scoring was rather straightforward. The scoring key was derived from the response alternates selected for each item by the "judges" who were in at least 80 per cent agreement with the experimenter on which was the "correct" response category. The scoring key is reproduced in Table 8.

Table 8. Scoring Key for the Degree of Informed Awareness Scale

Item Number	Keyed Response Alternate
III-44	A
III-45	A
III-47	B
III-48	C
III-52	A
III-53	B
III-54	C
III-55	A
III-57	C
III-58	C
III-59	A

Individual responses on the items were then compared to the scoring key. A weight of one was assigned each item if the subject's response agreed with the scoring key. A weight of zero was given for each item if the testee's response was not the same as that on the scoring key. The weights were summated cumulatively, yielding a possible score range from 0 to 11. A low score was indicative of a poor degree of informed awareness, while a high score reflected a well informed individual with respect to knowing about the introduction of the computer as mediated through his awareness of company pronouncements.

A problem existed in cases where response omissions to certain items occurred. One or two omissions out of eleven items was acceptable in terms of deriving a total score for the individual. An adjusted score was determined on the basis of the following formula:

$$\text{adjusted score} = \frac{\text{total score obtained} \times \text{number of items in scale}}{\text{number of items actually responded to}}$$

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The original pretest population comprised 283 persons. However, when terminal cases (N = 37) and omission cases (N = 29) were deleted, the experimental population contained 217 cases on this particular variable.²

Descriptive Statistics and Scalability

Based upon an analysis of 217 cases responding to the Degree of Informed Awareness scale, the following results were obtained as reflected in Table 9.

Table 9. Descriptive Statistics for Degree of Informed Awareness scale (N = 217)

Statistic	Value
Score Range (actual)	3-11
Mean Score	6.56
Median Score	6.79
Standard Deviation	2.19
Skewness Index	-0.32 ^a
S.E. of Measurement ^b	1.11

^aThis value may vary from +1 to -1, where zero indicates no skewness.

^bSee Appendix D.

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2. This figure (N = 217) underwent a further reduction resulting from cases being omitted on other variables with which Degree of Informed Awareness was to be associated during subsequent statistical manipulations.

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The score frequency distribution was fairly symmetrical with some clustering at the lower end of the scale (scores 3-5). However, the skewness index of $-.32$ indicated only a slightly negative skewing probably resulting from the clustering mentioned above. The index of skewness can be found in Garret (1937, p. 115), the formula is listed in Appendix D.

In order to provide some evidence for the scalar quality of the measuring instrument itself, the relationship between individual item scores and total scale scores was examined. This procedure was predicated upon the fact that a scale should possess characteristics which are monotonically increasing functions of the underlying continuum of knowledge about the computer installation. The more one knew about the installation, the higher the expected score for any particular item, and the higher the average total score should be for those responding correctly to any item.

The first approach to the accumulation of such evidence was to compare item scores for upper and lower 27 per cent subgroups as abstracted from the total score distribution. The results of such an approach are to be found in Table 10.

Table 10. Item Analysis Data for the 11 Items included in the Degree of Informed Awareness scale

Item	Mean Item Score		Difference	t ^a	p ^b
	Upper 27% (N=63)	Lower 27% (N=63)			
1	0.97	0.32	0.65	12.05	<.01
2	0.92	0.14	0.78	16.55	<.01
3	0.62	0.03	0.59	10.30	<.01
4	0.92	0.79	0.13	2.44	<.05
5	0.89	0.14	0.75	14.63	<.01
6	0.82	0.16	0.67	11.69	<.01
7	0.21	0.05	0.16	3.24	<.01
8	0.82	0.41	0.41	6.16	<.01
9	0.79	0.69	0.09	1.44	>.05
10	0.98	0.84	0.14	3.40	<.01
11	0.82	0.27	0.56	8.82	<.01

^aThe formula used for deriving the t value can be found in Appendix D.

^bP was based upon tabled values of t at the 5% and 1% levels of confidence where the degrees of freedom = $N_1 + N_2 - 2$ (df = 124).

The t test of significance used was based upon a consideration of the upper and lower 27% groups as representing essentially independent groups.³ The data compiled provided some evidence of the monotonic quality of the items, since higher item scores were significantly associated with higher total scores in practically all instances. The only exception to this was in the case of item number 9 where a t value of 1.44 was not significant at the 5% level of confidence.

3. The reader is referred to Edwards (1946, pp. 181-183) for a discussion of the t test of significance involving independent groups.

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Additional evidence to support the contention of the monotonic nature of the scale is provided by Table 11. The average total scores should show a consistent increase when such scores made by those choosing an "incorrect" alternate are compared with total scores achieved by those responding to the response alternate keyed "correct." As can be seen in Table 11 below, this was indeed the case.

Table 11. Average Total Scores for Respondents selecting Keyed and Non-keyed Alternates on each Item of the "Degree-Informed" Scale

Item	Average Total Score	
	Keyed Alternate	Non-keyed Alternate
1	7.32	5.31
2	7.39	4.73
3	8.19	5.81
4	6.64	6.02
5	7.52	5.28
6	7.50	5.22
7	7.88	6.23
8	7.03	5.42
9	6.60	6.15
10	6.59	5.51
11	7.27	4.35

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Item Intercorrelations

In order to provide an indication of the degree to which items in the scale were interrelated with each other, item intercorrelations were calculated. Because the scale scores represented a set of continuous measures which were empirically distributed in a normal fashion, it was decided to utilize the tetrachoric coefficient of correlation. Data was artificially reduced to two categories. In this instance the dichotomous categories were 1 and 2-3 which represented response categories for the items themselves. The r_{tet} was estimated by using Pearson's "cosine method," the table values for which are given by Edwards (1954, p. 510). The cosine method was derived from a cosine-pi approximation formula as given by Guilford (1950, p. 336). Table 12 shows the item intercorrelations.

Table 12. Inter-item Correlations for the "Degree-Informed" Scale using Tetrachoric Coefficients

Item	2	3	4	5	6	7	8	9	10	11
1	+ .75**	+ .26**	-.05	+ .33**	-.52**	+ .22**	+ .27**	+ .24**	+ .16**	+ .32**
2		+ .09	+ .39**	+ .46**	+ .36**	+ .07	+ .27**	+ .03	+ .30**	+ .27**
3			+ .33**	+ .04	-.05	.00	-.01	+ .20**	+ .44**	.00
4				+ .57**	+ .18**	+ .30**	+ .76**	+ .19**	+ .65**	+ .20**
5					-.14*	+ .36**	+ .21**	+ .10	+ .48**	+ .39**
6						+ .15**	+ .58**	+ .07	+ .39**	-.07
7							+ .48**	+ .04	+ .89**	+ .35**
8								+ .38**	-.35**	+ .28**
9									+ .60**	+ .07
10										+ .04

* Significant at the .05 level.

** Significant at the .01 level.

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These fifty-five item intercorrelations ranged from $+.89$ to $-.52$. The average item intercorrelation for the degree of informed awareness scale was $+.26$.

Item-Total Score Correlations

In order to further assess the extent of scalar internal consistency, item reliabilities were determined for the eleven items where the criterion was an upper and lower 27 per cent group based upon the total score.

Table 13. Item-Total Score Correlations for the Degree of Informed Awareness Scale based upon Upper and Lower 27% Groups (N = 63)

Item	Correlation With Total Score
1	.74**
2	.76**
3	.71**
4	.24
5	.73**
6	.65**
7	.34**
8	.44**
9	.12
10	.40**
11	.55**

** Significant at or beyond .01 level of confidence where degrees of freedom = $61(N-2)$.

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The procedure as outlined by Thorndike (1949, pp. 345-351) was used in obtaining the item-total score correlations. These item reliabilities were in the form of estimated product-moment correlations. Two items failed to show a significant correlation with the total score. The average item-total score correlation was found to be +.55.

Reliability

This section will review the several steps taken to ascertain the reliability for the Degree of Informed Awareness scale. More than one approach was taken in determining reliability so that several estimates could be compared, thus affording some idea of the reliability of the scale reliability measure itself.

Four separate means of obtaining a reliability estimate were used. These were: Hoyt's analysis of variance method, split-half reliability, reliability based upon the average inter-item correlation, and reliability derived from use of the Rulon formula.

The analysis of variance method, the results being given in Table 14, provided a reliability estimate of .74.

Table 14. Reliability for the "Degree-Informed" Scale based on Analysis of Variance

Source	Sum of Squares	df	Variance	r_{kk}
Persons	460.70	216	2.13	.74
Items	507.22	10		
Remainder	<u>1181.96</u>	<u>2160</u>	.55	
Total	2149.88	2386		

4. "Hoyt's method" may be found in Guilford (1954, pp. 383-385).

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The split-half (odd-even) reliability was determined from a 6 item - 5 item split by means of a Pearsonian product-moment correlation. The uncorrected reliability was .38. When this was corrected both for length and an uneven split, the reliability was found to be .72. For the formulae used in these calculations see Appendix D.

The third distinct effort at obtaining a reliability estimate was centered around the calculation of r_{tt} based upon the average inter-item correlation. All item intercorrelations were first converted into Fisher's Z coefficients⁵ in order to provide a normalized sampling distribution. They were then averaged arithmetically and the resulting mean Z was converted to an average r. The average inter-item correlation (\bar{r}_{ij}) was .26; the reliability was found to be .79. The formula for r_{tt} when figured from the mean inter-item correlation will be found in Appendix D.

Finally, reliability was estimated on the basis of Rulon's formula.⁶ The estimate provided by this technique was .81.

In way of recapitulation, then, Table 15 summarizes the reliability estimates arrived at via the four approaches discussed above. Taking into consideration the fact that the split-half and Rulon methods may overestimate r_{tt} , and both the item intercorrelation and analysis of variance techniques may underestimate the actual reliability, the likelihood is still good that the reliability is sufficiently high for inclusion of the scale in the study.

5. The reader is referred to Table H in Guilford (1950, p. 616).

6. For the appropriate formula, see Appendix D.

Table 15. Estimates of Scale Reliability

Method	r_{tt}
Analysis of Variance	.74
Split-Half	.72
Ave. Item Intercorrelation	.79
Rulon Formula	.81

Validation

As is the case with so many attitudinal research efforts, there was a sparsity of objective and independent data which could be utilized as criterion measures for the purpose of validating the scales. It was hence necessary to resort to an internal means of collecting evidence to support the validity of the scales. The means selected goes by several names: logical validity, construct validity, or the validity of known groups.

Perhaps the most intensive and explicit treatment of so-called logical or construct validity is that provided by Cronbach (1949; 1955). His definition for this specie of validity calls for validity to be established:

"inductively by naming the trait (traits) represented in the items at hand, or deductively by showing that the test corresponds to the definition of the trait intended to be measured. If we have a clear definition of a trait the test is supposed to measure, we can examine the items to see if they conform to the definition" (Cronbach, 1959, p. 48).

Operationally, one comes up with indicators of relationship between the test and behavior which the test should "predict" as predicated

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upon the definition formulated. The interpretation or definition of the trait (construct) generates testable hypotheses which are a means of confirming or rejecting the test as a measurer of that particular construct or trait. The definition of the construct measured by the test leads to a series of interrelated associations which permit an examination of relationships. In this respect logical or construct validation moves in a direction from the purely conceptual to the observable and predictable.

A similar approach has been suggested by Hyman (1955), who advocated the use of "internal checks" in the validation of attitude survey results. According to this source, the checks are made by examining items or questions whose contents the analyst has reason to believe should correlate in some defined manner with the item or set of items whose validity is being determined.

The material to follow is built around an attempt to provide evidence for the logical validity of the "Degree-Informed" scale. The general schema followed was to make some cogent hypotheses regarding predicted relationships between the scale in question and other variables based upon an understanding of the "trait" or construct which the "Degree-Informed" scale was supposed to measure. Scores on the "Degree-Informed" scale were then examined for subgroups differentiated on the basis of their responses to these other variables to see if the hypotheses were in fact substantiated.⁷

7. This technique for assessing construct validity was used throughout the study in validating the main variables.

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Contacts

The reader will recall that communicative contacts was one of the secondary variables earlier discussed. Aside from its consideration in this regard, it was hypothesized that if the "Degree-Informed" scale was actually a measure of the level of informed awareness about the computer installation, then the score on this variable should vary depending on the number of contacts with sources of information regarding the change. The table below substantiated this prediction, indicating a significantly higher "Degree-Informed" score was associated with an increasing number of contacts with sources of information.

Table 16. F Test for "Degree-Informed" Score Categories Differentiated on the Basis of the Number of Contacts with Information Sources

Source	Sum of Squares	df	Mean Square	F	P
Between	238.69	2	119.34	39.61	<.01
Within	<u>644.72</u>	<u>214</u>	3.01		
Total	883.41	216			

Perceived location within the communications network

It was reasoned that the amount of information one possesses about the changeover should be directly related to the position one occupies within the organizational communications network. The more central a position one enjoys, the greater the likelihood that the individual will be well informed, and conversely, the more peripheral a location held the better the chances that the individual will be poorly informed.

While no objective measure of location was available, there was a set of four items on both the supervisory and non-supervisory forms of the questionnaire designed to obtain information on employees' perception of their location within the network. Location was determined by responses which dealt with when information was received, and how much was received in general. These items were II-42, II-46, III-40, and III-41 respectively. Summated scores for these items were obtained. Below in Table 17 is the results of an F test showing that those perceiving themselves in a central location made significantly higher "Degree-Informed" scores than did those who perceived themselves as occupying a relatively peripheral position.

Table 17. F Test for "Degree-Informed" Score Categories Differentiated on the Basis of Perceived Location in Communications Network

Source	Sum of Squares	df	Mean Square	F	P
Between	120.59	2	60.29	17.01	<.01
Within	<u>744.29</u>	<u>210</u>	3.54		
Total	864.88	212			

Communicative interaction

This variable concerned itself with assessing the amount of communicative interaction employees engaged in. It was the resultant of two kinds of activity which the items attempted to measure: the total number of people one interacted with during work, and the extent to which information about the computer was discussed and exchanged.

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The four items constructed to serve this purpose were II-40, II-41, and III-42 in both the supervisory and non-supervisory forms, and III-43 in only the supervisory form. Summated scores for these items were obtained. The items appear in Appendix F.

If the Degree of Informed Awareness scale actually measured the level of information one possessed about the change, then it was hypothesized that the scores on this scale should demonstrate a positive covarying relationship with the amount of reported communicative interaction. Table 18 below bears out this expectation. The mean "Degree-Informed" scores increased significantly and in the predicted direction as the amount of communicative interaction increased.

Table 18. F Test for "Degree-Informed" Score Categories Differentiated on the Basis of Communicative Interaction

Source	Sum of Squares	df	Mean Square	F	P
Between	112.46	2	56.23	15.79	<.01
Within	<u>758.20</u>	<u>213</u>	3.56		
Total	870.66	215			

Level

As was the case with communicative contacts, occupational level also served as a secondary variable. This factor functioned in a dual capacity in that it was also used for purposes of demonstrating logical validity. It was predicted that those in a supervisory capacity would show significantly higher "Degree-Informed" scores than would those occupying non-supervisory positions. This was based upon the reasoning

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that: 1) since communications about the computer installation were channelled by management in a downward direction, supervisors would be closer to the source and be more likely to receive information in an undistorted fashion, and 2) it was a fact that supervisors were more frequently recipients of information about plans for the computer than were non-supervisors. The prediction was born out as can be seen in the Table below.

Table 19. t Test for "Degree-Informed" Score Categories Differentiated on the Basis of Occupational Level

Mean	σ_M	$M_1 - M_2$	σ_{m_d}	t	df ^a	p ^b
7.24	0.29	0.86	0.33	2.61	215	<.005
6.38	0.15					

$$^a df = n_1 + n_2 - 2 = 217 - 2 = 215$$

^bone-tailed test of significance

"Don't know" responses

To furnish further evidence of the construct validity of the "Degree-Informed" scale, another sort of predicted relationship was examined. It was reasoned that if employees were very well informed about the installation of the computer, then they probably were fairly well informed about a number of issues. Conversely, those who showed a lack of awareness about the computer might also be unknowledgeable concerning other topics as well. A measure of the extent to which respondents were prepared to give an opinion on an issue versus their lack of information

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to express a definite opinion was constructed. This consisted of a straight tally of all item "don't know" response categories checked by each respondent for the entire questionnaire. These summated "don't know" scores were then compared to the "Degree-Informed" scores.⁸ A significant relationship ($x^2 = 8.59$, $df = 2$, $p = <.02$) was found indicating those who were well informed with regards to the computer were the ones who, with respect to other issues, made relatively few "don't know" responses. Those who were poorly informed about the computer installation were found to have a greater number of "don't know" responses than the well-informed group.

Dissatisfaction with communications

It was reasonable to presume that those who were poorly informed would be more likely to perceive that communications were not handled in a satisfactory fashion within the company, while those who were relatively well informed would reflect no dissatisfaction with the way they were kept informed by the company about impending changes. A posttest measure of employee dissatisfaction with the implementation of changes was obtained from an open-ended item that read: "What are the things you like least about the way changes are handled in this company?" This was item III-18 in the posttest questionnaire; the responses were categorized into seven distinct classes. One of these categories reflected employee dissatisfaction with the way they were kept informed

8. The number of elicited "don't know" responses in the questionnaire ranged from zero to twenty-six.

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concerning changes. A dichotomy was established in which one group included those who responded that problems in communications were the reasons they disliked the way the company handled changes. Those expressing other reasons for disliking the way in which changes were implemented were put into a second group. These two groups were then compared for a difference in mean "Degree-Informed" scores. Table 20 below shows the results of a t test indicating that those who felt communications were a major contributor to poorly handled changes were also the ones to obtain a significantly lower Degree of Informed Awareness score when compared to those who attributed to other factors the poor way in which changes were implemented.

Table 20. t Test for "Degree-Informed" Score Categories Differentiated on the Basis of Perceived Problems in the Way the Company Handled Changes

Mean	σ_M	$M_1 - M_2$	σ_{m_d}	t	df ^a	p ^b
7.15	0.22	0.79	0.29	2.77	136	<.005
6.36	0.18					

^adf = $n_1 + n_2 - 2 = 138 - 2 = 136$

^bone-tailed test of significance

Expected involvement in the changeover

We are dealing again with one of the secondary variables which served a dual purpose, being also used for validation of the "Degree Informed" scale. As stated in Chapter Five, those who expected to be personally involved in the introduction of the IBM 650 would be more

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prone, hypothetically, to prepare themselves. These employees may become sensitized to the extent that they would pay increased attention to, and assimilate more of, the information passed down to them about the plans for introducing the computer. On this basis, then, one would predict that those expecting to be affected would have higher "Degree-Informed" scores than would the group of employees not expecting to be affected by the change. This prediction was confirmed as seen in Table 21 below. Those expecting to be affected received significantly higher "Degree Informed" scores than the employees who did not expect to be affected.

Table 21. F Test for "Degree-Informed" Score Categories Differentiated on the Basis of Expected Involvement in the Change

Source	Sum of Squares	df	Mean Square	F	P
Between	44.69	2	22.35	5.97	<.01
Within	793.79	212	3.74		
Total	838.48	214			

We have examined seven distinct predictions arising out of the definition of degree-of-informed-awareness. If the scale in fact measured what it was said to measure, then certain hypotheses based upon this definition should prove true. These hypotheses linked the "Degree-Informed" scale to other variable measures by means of explicit, expected relationships. In all instances these predicted associations were found and confirmed. On this basis, then, construct or logical validity has been demonstrated.



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Belief-Disbelief in Communications

This second of two independent variables had earlier been defined as: the degree to which an employee's expectancies or beliefs about an issue deviate from management's belief on the same issue as expressed through formal internal communications.

Selection of items and construction of the scale

This variable was designed as a complement to the Degree of Informed Awareness scale. The "Belief-Disbelief" scale ("BD" scale) used seven pairs⁹ of items. The first member of each pair was a "Degree-Informed" item and the second member was a "BD" scale item. The "BD" items were written so as to directly reflect the content of one of the "Degree-Informed" items. For example, one "BD" item read: "Will the computer change the work methods in all parts of the company?" The "Degree-Informed" item read: "The computer will change the work methods in all parts of the company." In the latter case, the respondent was to answer (on a predetermined basis) either that the company had: "said so," "said the opposite," or "said nothing about this subject." In the former instance, the employee was to respond with: in your opinion "yes," "possibly," or "no." The "BD" scale was arrived at independently of what management had actually said. In the case of the "Degree-Informed" scale, the a priori scoring of items was compared to actual management responses to these items. Any serious divergency meant the item was to be dropped. The "BD" scale, on the other hand, was based purely upon perceptions rather than on some empirical basis. If a subject said the

9. One item (III-66 on both forms of the questionnaire) was eliminated from further consideration because no clear-cut referrent in the "Degree-Informed" scale could be found, hence scoring was indeterminate.

company had made a statement on an issue, and then didn't believe this, disbelief was registered irrespective of what management might have really indicated on the particular matter. The "BD" scale items used in the scale appeared in the pretest questionnaire and can be found in Appendix F as items III-60 through III-67.

Scoring schema

The scoring and resultant keying of the "BD" scale was based upon the relationship obtaining between the two members of each item pair.

The basis for establishing a scoring system involved the following rationale. An individual, on a particular issue, may be situated at some point along a continuum of belief-disbelief, depending upon the opinion elicited from the respondent. The expressed opinion can reflect placement on the continuum from strong belief to strong disbelief. In addition, one may express opinion which is analogous to indecision or no opinion on the issue. Another dimension, which would appear to be intertwined with belief-disbelief, is that of awareness of others' opinion. One may express belief in some issue, both without information on the issue and/or without knowledge as to what beliefs are held by others. This would seem to be a different situation than the expression of belief (or disbelief) in the face of a knowledge about the issue and/or information regarding the beliefs of others on the same matter. It was the writer's contention that belief-disbelief, in conjunction with knowledge about others' beliefs on issues, represented a more extreme position on a continuum than did belief or disbelief in the absence of knowledge about the beliefs held by others. This is represented

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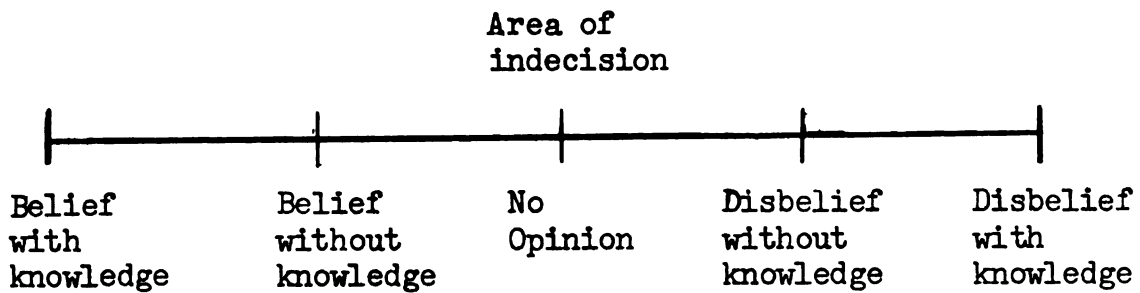


Fig. 2. Belief-disbelief continuum.

A theoretical interrelation between the two dimensions of belief-disbelief and informative status is given below in Figure 3.

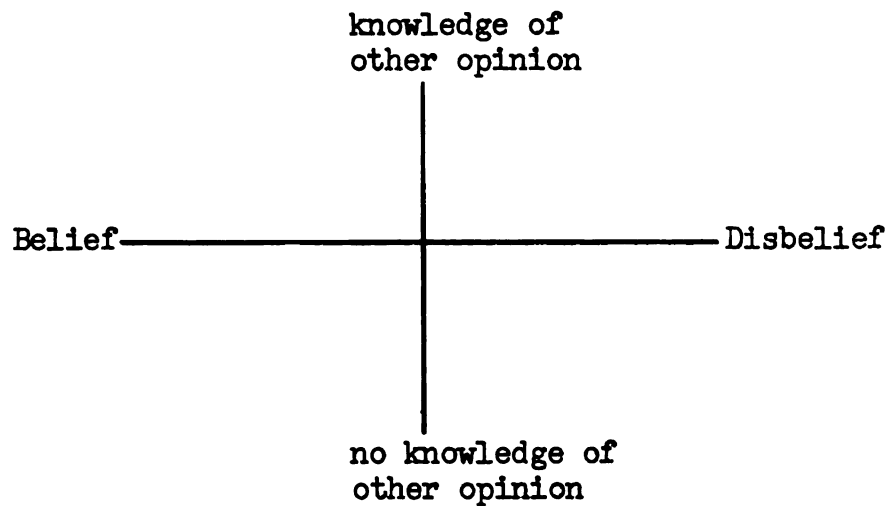


Fig. 3. Two-dimensional representation of interrelation between belief-disbelief and knowledge of other opinion on the issue.

The representation in Figure 3 permits a point to indicate any combination of placement on both the belief-disbelief and knowledge-of-other-opinion.

The scoring system shown below takes into account both the extent of belief on an issue as well as the subjects' perception as to whether the company had said something on the issue; i.e., awareness of management's belief on the same matter. With regards to the "BD" scale, it mattered little if the subject really knew what the company had actually expressed in the way of information. In this instance, we were solely interested in the employee's beliefs in relation to what he thought management had said on the issues.

Table 22 depicts the scoring schema used for the seven items comprising the "BD" scale. There were seven scorable categories reflected in the data analyses. The scoring weights ranged from +3 to -3, reflecting belief to disbelief. Item scores were first summated algebraically for each subject. Then, in order to change all total scores to like sign, +5 was added. The theoretical uncorrected total score range was +21 to -21. A low score on the "BD" scale indicated disbelief in what was thought to have been said by the company regarding a particular topic concerning the introduction of the IBM 650. A high score reflected belief in what was perceived as having been said by the company with regard to the forthcoming change. Responses on the "belief" portion of the questionnaire (items III 60-67) actually represented expectations about the effects of the computer on the work environment.

In order to account for one or two items which may have been omitted in a set of seven items, an adjustment was made in the total score. The formula for such an adjustment was provided the reader in an earlier portion of this chapter. Any omissions over two lead to the elimination of that subject's score or partial score from further consideration.

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Table 22. Scoring System for Belief-Disbelief in Communications Scale

Response Category	Scoring Combinations for Item-Pairs							Score Weight
	1 III44-60	2 III51-61	3 III55-62	4 III56-63	5 III59-64	6 III49-65	7 III54-67	
Belief with Information	A-C, B-A ^a	A-A, B-C	A-A, B-C	A-C, B-A	A-C, B-A	A-A, B-C	A-A, B-C	+3
Belief without Information	C-C	C-C	C-A	C-C	C-C	C-C	C-A	+2
Belief without prior Response ^b	X ^c -C	X-C	X-A	X-C	X-C	X-C	X-A	+1
Indecision with Information	A-B, B-B	A-B, B-B	A-B, B-B	A-B, B-B	A-B, B-B	A-B, B-B	A-B, B-B	0
Indecision without Information	C-B	C-C	C-B	C-B	C-B	C-B	C-B	0
Indecision without Prior Response	X-B	X-B	X-B	X-B	X-B	X-B	X-B	0
Disbelief without Prior Response	X-A	X-A	X-C	X-A	X-A	X-A	X-C	-1
Disbelief without Information	C-A	C-A	C-C	C-A	C-A	C-A	C-C	-2
Disbelief with Information	A-A, B-C	A-C, B-A	A-C, B-A	A-C, B-A	A-A, B-C	A-C, B-A	A-C, B-A	-3

^aA, B, and C refer to response alternates (first, second, and third) on both scales.

^bNo response on companion-item from "Degree-Informed" scale, although respondent registered expectation of computer effects in "ED" scale item.

^cX indicates non-response to a "Degree-Informed" item.

Some further clarification is due regarding the response categories developed for the "BD" scale. Belief or disbelief with information indicated that the respondent had, on the "Degree-Informed" scale, said that the company either had made the statement, or had said something opposite to it. Belief or disbelief without information was registered when the respondent, on the "Degree-Informed" scale, indicated that the company had said nothing on the subject.

Descriptive Statistics and Scalability

There was a total of 227 responses of a legitimate nature to the "BD" scale. The original population (N = 283) responding to this scale was corrected for omissions and terminal cases which dropped out between the pretest and posttest phase of the study. Table 23 below shows a summary of descriptive statistics regarding the "BD" scale.

Table 23. Descriptive Statistics for "BD" Scale (N = 227)

Statistic	Value
Score range (actual)	1-26
Mean score	13.61
Median score	13.45
Standard deviation	4.82
Skewness index	+0.10
S.E. of measurement	2.90

Some evidence was accumulated to support the contention that this

set of items represented a scale. The approach called upon for this purpose was a demonstration that the item scores were monotonically related to the total scale scores. The first procedure was to make a comparison between item scores for upper and lower 27 per cent groups as calculated from the total score distribution. The results of this comparison are entered in Table 24. The second procedure was to compare average total scores for different obtained item scores. That is, all those responding to an item with "belief" should reflect a higher average total score than would those who responded to an item with "disbelief." The results of this latter method are shown in Table 25.

Table 24. Item Analysis Data for the 7 Items comprising the "Belief-Disbelief" Scale

Item	Mean Item Score		Difference	t	p ^a
	Upper 27% (N=61)	Lower 27% (N=61)			
1	2.71	0.93	1.78	9.58	<.01
2	1.79	0.16	1.64	7.73	<.01
3	2.26	0.55	1.71	7.18	<.01
4	2.00	0.86	1.14	6.66	<.01
5	2.26	0.45	1.81	7.84	<.01
6	2.38	0.58	1.79	10.21	<.01
7	2.99	0.93	2.06	8.83	<.01

^adf = 122-2 = 120

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Table 25. Average Total Scores as a Function of Item Scores on the "Belief-Disbelief" Scale

Item	Item Alternate Scoring Weights			
	+3	+2	+1,0,-1	-2,3 ^a
1	15.50	13.50	9.71	9.40
2	16.85	13.43	12.51	8.82
3	15.61	12.33	11.33	11.07
4	16.37	14.04	11.46	9.33
5	15.88	13.06	11.50	8.94
6	17.05	14.07	10.27	7.00
7	16.96	16.67	13.39	10.77

^aItem scores (assigned weights) -2 and -3 were combined because for some items the frequency of either -2 or -3 was very small, ranging from 1 to 4.

The data in Table 24 suggests that the "BD" scale items were monotonic to the extent that higher mean item scores were consistently and significantly associated with lower total scores. Likewise, lower mean item scores were significantly associated with lower total scores in all instances. The upper 27 per cent and lower 27 per cent subgroups based on total score formed the criterion groups for this comparison.

Supplemental evidence concerning the monotonic nature of the "Belief-Disbelief" scale was supplied by the data in Table 25. It will be noted that the average total scores were consistently an increasing function of "higher" item scale scores. That is, for any item, the average total score was highest for the group responding in such fashion as to merit a

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+3 weight for the item. The mean total scale score decreased in a regular progression so that the average total score was lowest for that group of respondents who, by their response combination, obtained a -2 or -3 score weighting for the item.

Item Intercorrelations

A 6x6 intercorrelation matrix was prepared in order to portray the interrelationship between the seven items in the "Belief-Disbelief" scale. As discussed earlier, the tetrachoric correlation coefficient had been selected to estimate the relationships. The data was reduced to artificial categories where the underlying scale measures were normally distributed and continuous. The dichotomous categories were 1-4 and 5-7, which represented item scores corrected for sign. Table 26 gives the set of intercorrelations.

Table 26. Inter-Item Correlations for the "Belief-Disbelief" Scale using Tetrachoric Coefficients

Item	2	3	4	5	6	7
1	-.12*	+.28**	+.09	+.36**	+.28**	+.15**
2		-.16**	+.20**	+.08	+.20**	+.01
3			-.02	-.08	+.27**	-.02
4				-.02	+.25**	+.15**
5					+.21**	+.02
6						+.06

*Significant at the .05 level

**Significant at the .01 level

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The intercorrelations for these twenty-one pairs of items ranged from $+.36$ to $-.16$, the average intercorrelation being $+.18$.

Item-total score correlations

As a means of securing additional information concerning the internal consistency of the "ED" scale, item-total score correlations (item reliabilities) were determined for the seven items. The criterion used were upper and lower 27 per cent subgroups based on the total score distribution. These item reliabilities took the form of product-moment correlations as estimated by a technique suggested by Thorndike. The obtained correlations ranged from $.38$ to $.62$, with the mean item-total score correlation being $.51^{10}$. All of the scale items correlated at better than the one per cent level of confidence with the total score.

Table 27. Item-Total Score Correlations for the Belief-Disbelief in Communications Scale based Upon Upper and Lower 27% Groups (N = 61)

Item	Correlation with Total Score
1	$.62^{**}$
2	$.41^{**}$
3	$.48^{**}$
4	$.38^{**}$
5	$.42^{**}$
6	$.61^{**}$
7	$.60^{**}$

** Significant at or beyond $.01$ level of confidence where $df = 59$ (N-2)

10. Fisher's Z coefficients were used in determining this value.

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Reliability

As was the case with the "Degree-informed" scale, four separate methods of assessing reliability were utilized in order to establish the presence of a stable reliability estimate for the scale. Hoyt's method, split-half reliability, reliability based on the mean inter-item correlation, and the Rulon formula were all used.

Hoyt's method resulted in a reliability estimate of .64 as reflected in the data of Table 28.

Table 28. Reliability for the "Belief-Disbelief" Scale based on Analysis of Variance

Source	Sum of Squares	df	Variance	r_{kk}
Persons	852.02	226	3.77	.64
Items	592.11	6		
Remainder	<u>1845.52</u>	<u>1357</u>	1.36	
Total	3289.65	1589		

Another estimate of reliability was made by using the split-half (odd versus even) method. The resulting reliability figure was subsequently corrected for length and for an uneven split (4-3). The uncorrected reliability ($r_{tt} = .34$) was corrected and was found to be .51

A third avenue used to examine reliability was via the mean item intercorrelation. The reliability based on this method turned out to be .61

Finally, the Rulon formula based upon differences in scores on two

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halves of the scale was utilized to estimate reliability. No correction for length was required for this particular method. The reliability was .70.

Table 29 below summarizes these four estimates of the scale reliability.

Table 29. Estimates of Scale Reliability

Method	r_{tt}
Analysis of Variance	.64
Split-Half	.51
Ave. Item Intercorrelation	.61
Rulon Formula	.70

Considering the fact that the "Belief-Disbelief" scale was actually a combination of two sets of measures (with unreliability probably being compounded), and that it consisted of only seven items, the obtained magnitude of r_{tt} was not surprising.

Validation

As was discussed earlier in this chapter, the best course to pursue with regards to establishing the validity of the scales (in this study at any rate) seemed to be that of providing evidence for construct validity. Explicit hypotheses generated on the basis of a definition of the scale were tested. The results are presented below.

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Dogmatism

One attribute or personality trait for which there were measures, was dogmatism¹¹. This particular trait, among other things, includes the conceptualization of highly dogmatic individuals as persons who are relatively more accepting or rejecting of others depending upon whether or not they agree or disagree with their own beliefs. It is not difficult to translate this partial definition of dogmatism into terms relevant to the study, and specifically to response towards communications. There are direct implications for response to the "Belief-Disbelief" scale in the assessment of dogmatism.

It was hypothesized that if the "BD" scale actually measured one's belief in what he thought he had been told, then scores on the scale should show marked differences for groups which were differentiated on the basis of the personality trait of dogmatism. The reasoning went thusly: the highly dogmatic individual, when requested to respond by indicating his acceptance or rejection of some issue of "fact" in terms of his personal belief system or set of expectancies, would be found to occupy a more extreme position in this acceptance or rejection than would an individual low in dogmatism. This more extreme placement on a continuum of belief-disbelief is an operational reflection of a greater unwillingness to accept ambiguity or to tolerate a middle position on some issue. These persons either agree or disagree. In addition to predicting either a high or low, but not intermediate, score on the "BD"

11. For a full discussion of dogmatism, its conceptualization and measurement, the reader is referred to the work of Rokeach (1956).

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scale, the direction of obtained scores was also predicted. It was additionally deduced that the highly dogmatic subject, in the face of an unstructured situation (an impending change which was yet to occur) would more likely respond by disbelief than by belief in what they were told in general about the change. Those low on the dogmatism scale would conversely demonstrate a greater overall acceptance (belief) in what they were told about the change. The greater likelihood of disbelief being registered by the high dogmatics was a result, theoretically, of a greater degree of selectivity (perceptual defensiveness) and a lesser degree of permeability to the new and unique.

The measure of dogmatism was obtained from an eleven item abbreviated form of Rokeach's Dogmatism (D) Scale. These items are VI 40-50 in both the supervisory and non-supervisory forms of the questionnaire (Appendix F). For a complete discussion concerning the construction and scoring of this 11 item scale, see Trumbo (1958, pp. 87-91).

Table 30 presents the results of a t test in which groups differentiated on high-low dogmatism were compared on mean "Belief-Disbelief" scores. The high dogmatic group had a significantly lower "BD" score than the low dogmatic group, indicating greater disbelief for the high dogmatic group. This substantiated the original hypothesis.

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Table 30. t Test for "Belief-Disbelief" Score Categories Differentiated on the Basis of High-Low Dogmatism Scores.

Mean	σ_m	$M_1 - M_2$	σ_{m_d}	t	df ^a	p ^b
14.06	0.44	1.51	0.68	2.20	149	<.025
12.56	0.52					

^adf - n + n - 2 = 151-2 = 149

^bone-tailed test of significance

General Job Satisfaction

Another predicted relationship arising out of the implications of the definition for the "BD" scale centered around general job satisfaction. It was thought that the extent to which one believed, or placed confidence in, company pronouncements also reflected one facet of on-the-job "morale" or general job satisfaction. The individual who was disgruntled and dissatisfied with his job more likely would also react in a negative fashion to communications from management; i.e., express greater disbelief than those who were generally satisfied with their work.

General job satisfaction was measured by means of a one-item index, X-39 on both forms of the questionnaire:

"Taking everything into account, how satisfied are you with your job?"

1. Completely satisfied
2. Very satisfied
3. Quite satisfied
4. Somewhat satisfied
5. Not satisfied"

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The item, conforming to the Likert-type format,¹² was scored from 1 to 6, indicative of increasing job satisfaction. "BD" total scale scores were compared for two groups, those responding to alternates 1 and 2 (completely or quite satisfied) and those checking alternates 4 and 5 (somewhat satisfied or not satisfied). A t test (see Table 31) indicated that those quite satisfied with their jobs also believed to a significantly greater extent what they thought they had been told about the computer than did those expressing low general job satisfaction.

Table 31. t Test for "Belief-Disbelief" Scores Differentiated on the Basis of High and Low General Job Satisfaction

Mean	σ_m	$M_1 - M_2$	σ_{m_d}	t	df ^a	p ^b
13.72	0.34	1.74	0.71	2.46	150	<.025
11.97	0.62					

^adf = $n_1 + n_2 - 2 = 152 - 2 = 150$

^bone-tailed test of significance

Confidence in the company

Another variable which is in some degree another facet of general on-the-job "morale," at least theoretically, would seem to be confidence expressed in the company one works for. Just as those who profess high job satisfaction are the ones who tend to believe what the company tells them, the ones who express confidence in their company are also likely

12. The reader will find a full discussion of this kind of item in the next chapter.

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to be the ones who believe what their management tells them. Certainly, one operational measure of confidence in the company would logically seem to be a predisposition to accept as valid the pronouncements made by the company, particularly when this concerns a major change.

There were five Likert-type items used as an index in measuring confidence in the company. These items appeared as I34-38 on the post-test questionnaire (See Appendix F). A low score indicated high confidence and a high score reflected low confidence. Table 32 below shows the results of a t test between groups varying on expressed confidence in the company. "BD" scale scores for the high-confidence group were significantly higher than for the low-confidence group, indicating that the high confidence group were more prone to believe statements perceived as made by the company about changes than were those who had relatively little confidence in their organization.

Table 32. t Test for "Belief-Disbelief" Scores Differentiated on the Basis of High and Low Confidence in the Company

Mean	σ_m	$M_1 - M_2$	σ_{m_d}	t	df ^a	p ^b
14.01	0.39	1.38	0.58	2.39	180	<.025
12.63	0.42					

^adf = $n_1 + n_2 - 2 = 182 - 2 = 180$

^bone-tailed test of significance

Confidence in Supervision

A fourth hypothesized relationship concerned the association expected between "Belief-Disbelief" scores and scores on a measure of

confidence in supervision. An operational indication of confidence in one's supervisors would seem to be the extent to which belief was placed in what management said about various issues, since supervisors are management representatives. Therefore, on these grounds, a prediction was made that those expressing a high degree of confidence in their supervisors would also be more likely to believe what had been told by the company with respect to the change. This prediction was born out by the data as shown in Table 33. The items used to measure confidence in supervision were of the Likert type, being scored by attaching weights of from 1 to 5 to the response alternates. Low scores indicated high confidence. The index for this variable was a cumulative score for four items, identified as I-30 to I-33 on the posttest questionnaire in Appendix F.

Table 33. t Test for "Belief-Disbelief" Scores Differentiated on the Basis of High and Low Confidence in Supervision

Mean	σ_m	$M_1 - M_2$	σ_{m_d}	t	df ^a	p ^b
14.14	0.38	2.28	0.59	3.82	171	0.005
11.86	0.45					

^adf = $n_1 + n_2 - 2 = 173 - 2 = 171$

^bone-tailed test of significance

Degree informed

One final relationship was examined in an effort to provide evidence of construct validity for the Belief-Disbelief in Communications scale. The predicted relationship in this case involved the other independent

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variable. It was hypothesized that those persons who were better informed about the impending changeover to the computer were more likely to believe what they were told. Those who were poorly informed were more likely to display disbelief in what they were told. Employees possessing relatively greater information about the change, in terms of knowing what the company had actually said with regards to certain issues, were also probably the one's in a position to know what was going to happen. They were also more likely to be serving in a supervisory capacity and to have been personally involved in some way in planning the transition. Those who were highly knowledgeable were also likely to manifest a more intelligent discrimination between fact and fancy.

The "Degree-Informed" scale has already been described at length. An F test was performed to investigate whether or not the means on the "Belief-Disbelief" scale for groups varying in the Degree of Informed Awareness differed more than would be reasonably expected if they had arisen from random sampling from a common population. The F test ($F = 12.02$, $p = <.01$) indicated that the means did differ significantly, thus supporting the hypothesis that those who are better informed are also the ones who are more likely to believe what they are told.

Table 34. F Test for "Belief-Disbelief" Score Categories Differentiated on the Basis of "Degree-Informed" Scores

Source	Sum of Squares	df	Mean Square	F	p
Between	526.783	2	263.392	12.02	<.01
Within	<u>4689.530</u>	<u>214</u>	21.914		
Total	5216.313	216			

A set of five hypotheses constructed on the basis of implications of the construct "belief-disbelief-in-communications" were examined. In all cases statistical confirmation was achieved, suggesting that the "ED" scale does in fact possess construct validity to an acceptable extent.

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CHAPTER SEVEN

MEASURING THE DEPENDENT VARIABLES

This chapter shall follow in principal the same organization of content as used in the preceding chapter for presenting specific information on the manner in which the two dependent variables were measured.

Change in Readiness to Accept Change

This variable was defined as: a shift or change in the general readiness to accept job-related changes of an unspecified nature. The measurement of this variable involved securing a set of deviations based upon differences obtained in scale scores on the pretest and posttest versions of the questionnaire for the Readiness for Change scale.

As was discussed in Chapter Four, this dependent variable was designed to probe employee response to change as a generalized, global kind of predisposition. A companion dependent variable was also constructed in order to obtain a specialized response to change where the focus was an actual change occurring in the workers' job environment.

Selection of items and construction of scale

Before progressing with a discussion of the actual steps taken in construction and evaluation of this scale, some general attention will be first directed toward the usage of the Likert technique¹ for the construction of the Readiness for Change attitude scale. The method has been described as follows:

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1. The technique was devised and originally outlined by Rensis Likert (1932).

"the task set for the subjects is such as to allow individual differences with respect to the attitude continuum to be expressed. Subjects respond to each item on the basis of the extent to which they are willing to endorse the item. Stimuli are selected so as to increase the individual differences with respect to the attitude continuum. Different weights might be given to the stimuli ---- on the basis of their power to discriminate between subjects, and not on the basis of their relative positions on the attitude continuum" (Torgerson, 1958, p. 47).

The original procedure set up by Likert for scoring responses was based upon a determination of scale values for each of the alternates for every item. These values were a function of the response distributions to the item; i.e., standard scores for each response category were determined. These standard scores were then summated for all items comprising the scale to provide a scale score for each subject.

Likert found that scores based upon the relatively simplified assignment of integral weights or interval values correlated .99 (Edwards, 1957) with the more complicated system of weights. Response classes were weighted so that responses made by individuals with the most "favorable" attitudes always had the highest positive weight. The total score was obtained by simple cumulative addition of the individual item scores.

In this study, the Likert scaling procedure was deemed as an adequate means of assessing a latent attitude continuum. It had the additional benefit of being a relatively easy procedure to utilize. The simplified means of scoring item alternates, and thereby deriving scale scores, was adapted so that an item score of "1" was indicative of a negative response (resistance to change), "2" was a negative-neutral response, "3" a neutral response, "4" a positive-neutral response, and finally, a "5" indicated a positive response (readiness to accept change).

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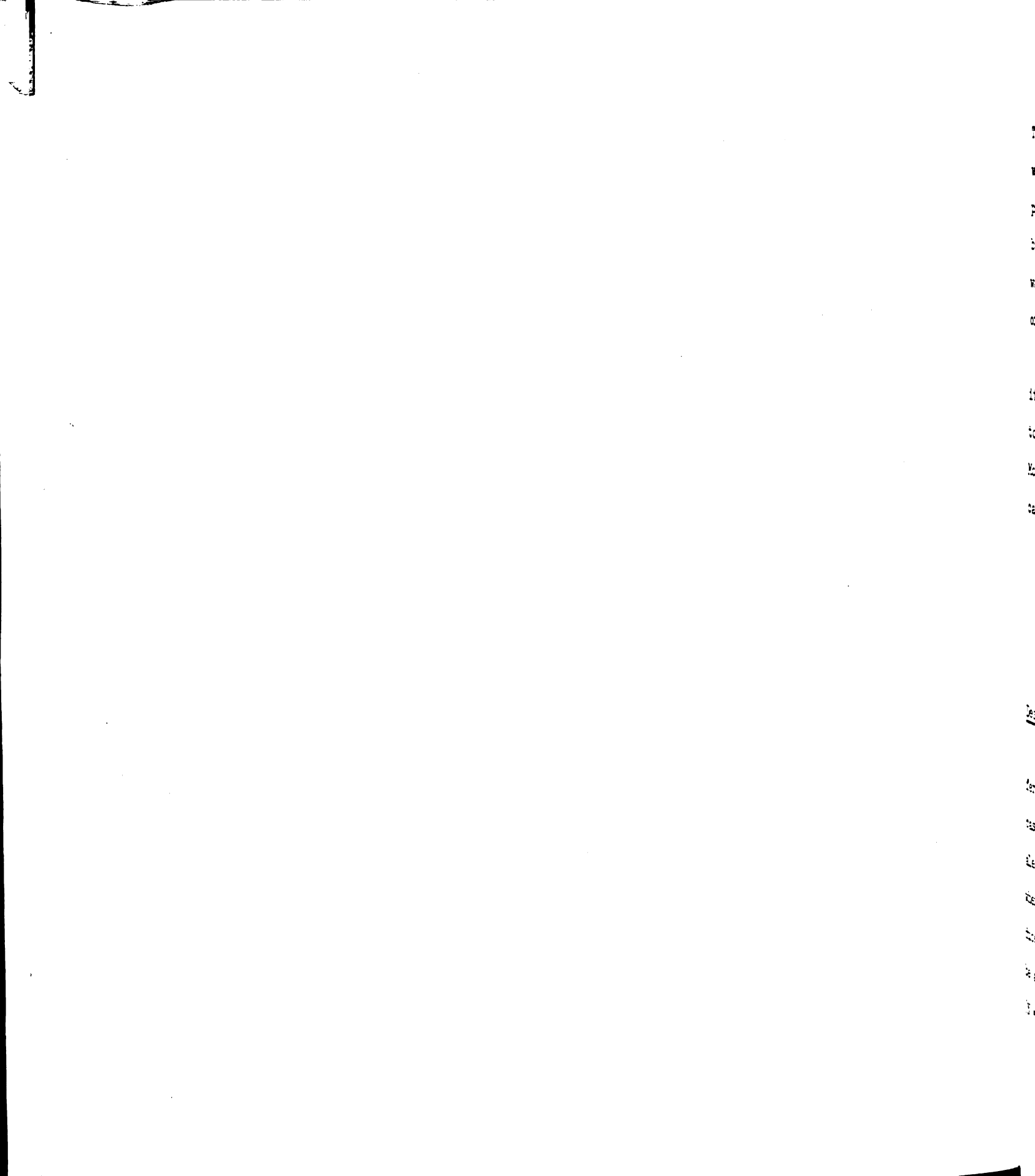
The reader at this point is referred to Appendix F where he will find the scale under discussion identified as items I-56 and IV-40 to 47 on both the supervisory and non-supervisory forms of the pretest questionnaire. The identical nine items are repeated in the posttest questionnaire as items III-16 and I-39 to 46. Each of the nine items constructed for inclusion in the scale require responses of agreement or disagreement to statements expressing either a proclivity toward desiring changes in the work situation, or an intolerance toward the ever-changing quality of the job. Change in the job is conceptualized as a general attribute inherent in the employment situation; i.e., the dynamic or static overall quality of the work setting in which one is embedded.

Scoring schema

Responses to the nine items in the scale were coded serially from one to five with the item scores reflecting favorable or unfavorable change attitudes. Summated scores for the items were taken as the scale score.

While this sufficiently describes the scoring of the Readiness for Change scale, there remains the description of procedures followed in arriving at a change score reflecting alterations for each questionnaire respondent in the way he responded (comparatively) to the Readiness for Change scale from pretest to posttest administration.

The measured deviations were used to indicate changes over time in readiness to accept general job-related changes. These deviations were obtained by calculating the arithmetic difference between the total scale scores on the pretest and posttest versions of the scale for each subject.



The difference-score range for the scale was found to be -19 to +15, where a minus value reflected a decrease in readiness for change and a plus value indicated an increase in readiness for change. In order to be able to deal entirely with scores of like sign, a constant (+20.0) was added to all difference scores. This resulted in an adjusted range of entirely positive scores (1-35, where 1 = -19 and 35 = +15).

With respect to the occurrence of response omissions to some of the items in the scales, two omissions were accepted out of nine. An adjusted total score was calculated according to the formula presented earlier. More than two non-responses in the set of nine items resulted in the discard of the scale score for that individual.

A resume¹ of the scoring schema is presented as follows:

<u>Empirical score change</u>	<u>Inferred response class</u>
increase from pre to post (+)	increase in readiness for change
decrease from pre to post (-)	decrease in readiness for change

Descriptive statistics and scalability

Since change-in-readiness-to-accept-change was a derivation of difference scores from the pretest and posttest administrations, any omitted cases in either the pretest or posttest had to be reflected in the equivalent and opposite set of data. The original pretest population (N = 283), when corrected for terminal cases (N = 37) and omissions (N = 9), was reduced to 237 cases. The original posttest population (N = 295) had to be adjusted for cases added since the pretest (N = 49) and for omissions (N = 9), leaving a total of 237 cases (N pretest = N posttest = 237).

Below in Table 35 are included various statistics which describe the

characteristics of the change scale, and the pretest and posttest Readiness for Change scales.

Table 35. Descriptive Statistics for Readiness for Change Scale (N = 237)

Statistic	Pretest Scale	Value	
		Posttest Scale	Change Scores
Score Range (actual)	13-45	12-43	1-35 ^a
Mean Score	27.34	26.43	19.10
Median Score	27.41	26.17	19.04
Standard Deviation	6.42	6.11	5.66
Skewness Index	+0.00	+0.13	+0.03
S.E. of Measurement	3.36	2.62	4.29

^aDeviation scores adjusted to like sign by addition of +20 to all scores.

With respect to securing evidence for the monotonic quality of the items in the Likert scale, Trumbo (1958) provided ample support that higher item scores were associated with higher total scores in all instances. He also demonstrated that average total scores for respondents choosing each alternative for each of the nine items consistently increased from one alternate to the next (going from "1" to "5," respectively).

Data is supplied here regarding the same kinds of relationships as immediately mentioned above, but applying to the population in this investigation. In Table 36 are the results of an item analysis relating mean pretest item scores to criterion groups composed of the upper and lower 27 per cent on the total score ($N_u = N_l = 64$).

Table 36. Item Analysis Data for the 9 Items comprising the Readiness for Change Scale ($N_1 = N_2 = 64$)

Item	Mean Item Score		Difference	t	p ^a
	Upper 27%	Lower 27%			
1	3.95	2.86	1.09	7.64	<.01
2	2.92	2.05	0.88	3.67	<.01
3	3.91	1.83	2.08	10.71	<.01
4	4.03	2.09	1.94	11.27	<.01
5	4.37	2.18	2.18	13.00	<.01
6	3.72	2.42	1.31	6.08	<.01
7	3.95	1.65	2.31	13.42	<.01
8	4.43	2.15	2.28	16.04	<.01
9	4.29	2.40	1.89	9.51	<.01

$$^a df = n_1 = n_2 - 2 = 64 + 64 - 2 = 126$$

As can be quickly seen, the internal consistency of all items was demonstrated by a significant difference ($p = <.01$) between item mean scores when comparisons were made for the upper and lower 27 per cent criterion groups based on the total score. The upper 27% subgroup obtained significantly higher average item scores for all items than did those in the lower 27 per cent subgroups.

Average total scores for respondents varied in a regular and consistent fashion with the particular item alternate responded to. The highest average total scores were obtained by those responding to the alternate with a weight of +5, while those answering to an alternate with the weight of +1 received the lowest average total scores. For these results, see

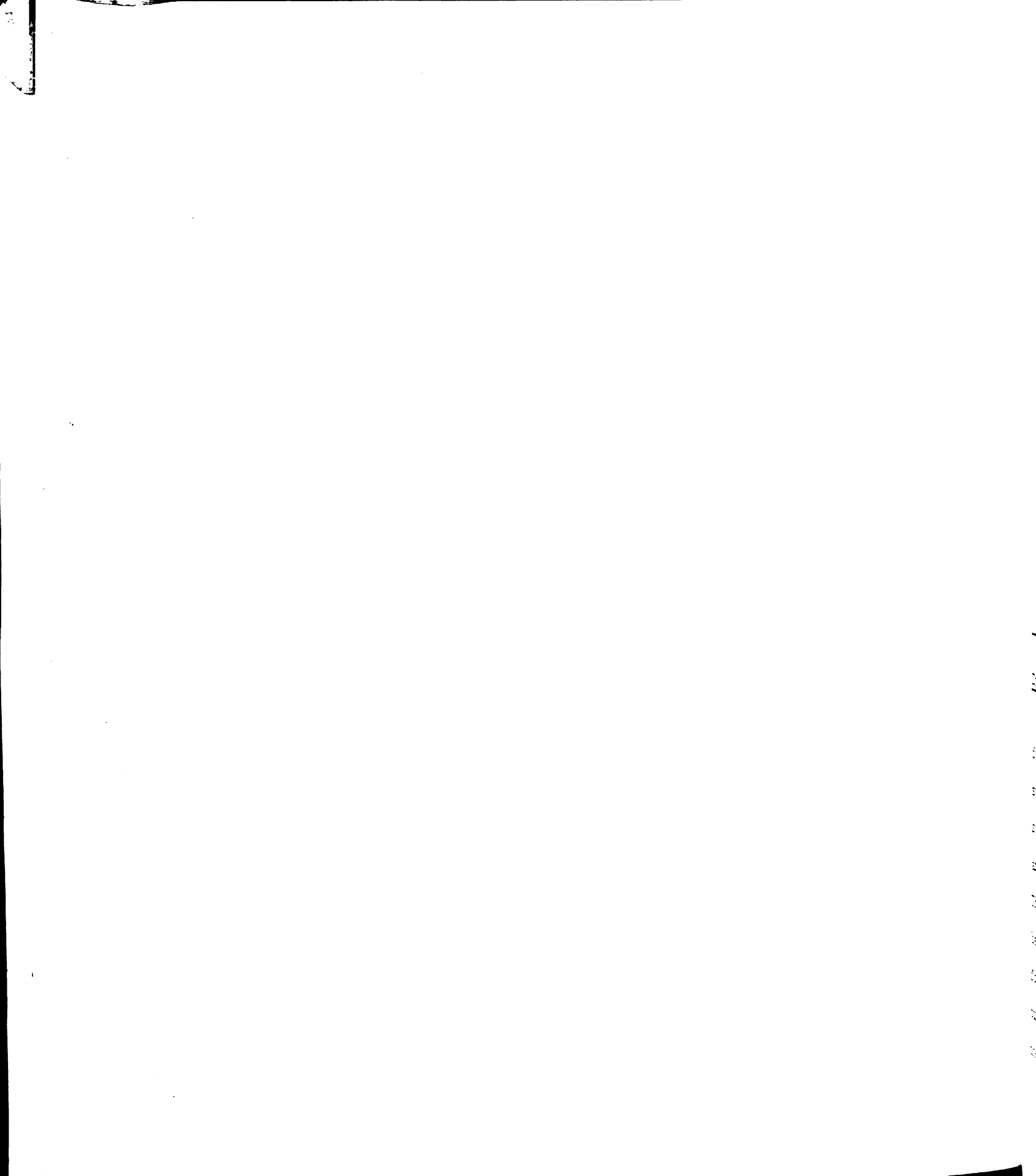


Table 37 below.

Table 37. Average Total Scores as a Function of Item Alternates selected for each of the 9 Items

Item	<u>Item Alternate Scoring Weights</u>				
	1	2	3	4	5
1	19.00	23.10	25.38	29.56	34.08
2	26.31	24.91	26.06	30.53	32.75
3	21.78	25.37	27.14	30.60	33.75
4	20.86	24.09	26.97	29.56	35.83
5	19.27	23.32	25.84	28.54	33.84
6	22.04	25.71	25.96	28.81	33.02
7	21.09	25.51	28.38	29.87	36.54
8	18.87	23.55	24.89	29.45	35.00
9	23.95	24.22	25.95	28.71	32.66

Difference in mean pretest and posttest scores

In the process of obtaining deviation scores to be used as an indicator of changes in the readiness to accept changes, it was a logical step to investigate the significance of the difference between the mean scale score obtained on the pretest administration of the questionnaire and the mean scale score obtained on the posttest for all subjects. The table below shows the results of such a comparison. The difference between means on the Readiness for Change scale over administrations was found to be significant ($p = <.05$), suggesting that a real shift in attitude towards acceptance of job-related changes took place sometime between the pretesting, introduction of the computer, and the posttesting. The

direction of the change in the mean scale scores additionally suggested that the experimental population as a whole shifted toward becoming slightly less prone in their readiness to accept generalized changes as an inherent component of the work environment.

Table 38. Significance of the Difference between Pretest and Posttest Mean Total Scores on the Readiness for Change Scale (N = 237)

Mean (Pre)	Mean (Post)	Difference	σ_d	$\sigma_{m_d}^a$	t	p ^b
27.34	26.43	0.91	5.66	0.37	2.48	<.05

^aBased upon S.E. of mean difference for matched pairs, see appendix D.

^bdf = N-1 = 236, where N is number of pairs.

Item intercorrelations

Some information regarding the degree of interrelationship existing among the matrix of items making up the pretest scale is offered in Table 39 below. The intercorrelations ranged in magnitude from $-.34$ to $+.62$, the average item intercorrelation being $+.23$.

Table 39. Item Intercorrelations for the Pretest Readiness for Change Scale

Item	2	3	4	5	6	7	8	9
1	-.34 ^{a**}	+.17 ^{**}	+.19 ^{**}	+.36 ^{**}	-.15 ^{**}	+.34 ^{**}	+.37 ^{**}	+.09
2		-.03	+.06	+.03	-.09	+.20 ^{**}	+.10	+.03
3			+.41 ^{**}	+.19 ^{**}	+.21 ^{**}	+.42 ^{**}	+.40 ^{**}	+.33 ^{**}
4				+.41 ^{**}	+.14 [*]	+.34 ^{**}	+.53 ^{**}	+.11 [*]
5					+.30 ^{**}	+.62 ^{**}	+.45 ^{**}	+.32 ^{**}
6						+.10	+.18 ^{**}	+.04
7							+.48 ^{**}	+.23 ^{**}
8								+.19 ^{**}

^atetrachoric coefficients.

*Significant at the .05 level.

**Significant at the .01 level.

The posttest Readiness for Change scale provided the following set of inter-item correlations. The range of correlations for the posttest set was $-.06$ to $+.72$, with the mean intercorrelation being $+.33$.

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Table 40. Item Intercorrelations for the Posttest Readiness for Change Scale

Item	2	3	4	5	6	7	8	9
1	+.66 ^{a**}	+.31 ^{**}	+.06	+.58 ^{**}	+.20 ^{**}	+.59 ^{**}	+.56 ^{**}	+.12 [*]
2		+.17 ^{**}	-.06	+.13 [*]	+.12 [*]	+.29 ^{**}	+.18 ^{**}	+.16 ^{**}
3			+.57 ^{**}	+.45 ^{**}	-.03	+.43 ^{**}	+.58 ^{**}	+.27 ^{**}
4				+.30 ^{**}	+.24 ^{**}	+.35 ^{**}	+.53 ^{**}	+.07
5					+.32 ^{**}	+.59 ^{**}	+.57 ^{**}	.00
6						+.21 ^{**}	+.19 ^{**}	+.25 ^{**}
7							+.72 ^{**}	+.05
8								+.26 ^{**}

^atetrachoric coefficients.

*Significant at the .05 level.

**Significant at the .01 level.

The intercorrelations were in the form of tetrachoric coefficients, where the item scores were artificially dichotomized on the basis of response alternates into two groups: those responding to alternates 1 and 2, and those responding to either 3, 4, or 5.

Item-total score correlations

To provide information on the extent to which item scores were related to the total score, Thorndike's method was used to ascertain estimated product-moment correlation coefficients between each of the pretest scale item scores and the total score. Table 41 presents this information.

Table 41. Item-Total Score Correlations
for Readiness for Change Scale ($N_u=N_1=64$)

Item	Correlation with Total Score
1	.54**
2	.50**
3	.68**
4	.70**
5	.68**
6	.50**
7	.68**
8	.80**
9	.61**

**Significant at beyond .01 level,
df = N-2 = 62.

All of the nine items in the Readiness for Change scale correlated at well beyond the 1% level of confidence with the total score.

Reliability

The Readiness for Change scale, as was indicated, has been used in previous studies. For an extended discussion of reliability data for the scale in another context, the reader is referred to the work of Trumbo (1958). In his usage of the scale, it was found that the product-moment r_{tt} between two half-scale scores, when corrected for length by the Spearman-Brown formula, was .79.

As has been the practice with the independent variables, several

estimates of reliability were obtained in order to not only assess the reliability of the scale, but to shed some light on the stability of the reliability estimate itself.

Hoyt's method was used to determine reliability for both the pretest and posttest sets of scores on the Readiness for Change scale. These are shown below in Table 42.

Table 42. Analysis of Variance Estimates of Reliability for the Pretest and Posttest Readiness for Change Scale

Scale Administration	v^2 persons	V_{error}	r_{kk}
Pretest	4.57	1.23	.73
Posttest	4.50	1.18	.74

v^2 = variance

These reliability estimates agreed with each other quite well, suggesting stability over a six month period of time.

Another estimate of reliability was based upon a product-moment r between scale scores on the pretest form of the questionnaire and on the posttest form ($N = 237$ pairs). The test-retest reliability was found to be .60, which was somewhat lower than either of the reliability coefficients found for the pretest and posttest sets of scale scores.

A third estimate of reliability was accomplished by determining the split-half (odd versus even) reliability based upon a correlation between half-scale scores for the pretest and posttest administration. The uncorrected correlation between half-scale scores was .58 and .57, respectively. When these were corrected for both an uneven split (5-4) and for length,

r_{tt} was found to be .74 and .65.

In concluding the exploration of the reliability of the measuring instrument for Readiness for Change, average item intercorrelations were used. Both pretest and posttest sets of scores were involved. The results of this fourth method are shown in Table 43.

Table 43. Reliability Estimates for Pretest and Posttest Readiness for Change Scales determined from Mean Inter-Item Correlations

Scale Administration	\bar{r}_{ij}^a	r_{tt}
Pretest	.23	.72
Posttest	.34	.82

^a \bar{r}_{ij} = mean item intercorrelation

Table 44 was prepared to summarize these estimates. Reliability estimates for the pretest set of scale scores varied from .72 to .74, while the reliability for the posttest scale appeared between .65 and .82. Reliability estimates for the pretest scale appeared to be more stable than were those for the posttest scale. It was suspected that perhaps the manner of splitting the scale into half-scale scores may have contributed to some erratic alteration in reliability, such that the posttest split-half r_{tt} was somewhat aberrant when compared with the other estimates of posttest scale reliability.

Table 44. A Comparison of Reliability Estimates for the Readiness for Change Scale

Method	Scale Administration	
	Pretest	Posttest
Analysis of Variance	.73	.74
Mean Item Intercorrelation	.73	.82
Split-Half (odd-even)	.74	.65
Test-Retest	.60	

In addition to obtaining reliability estimates for the scale itself, it was necessary to secure an estimate of the reliability of the deviation scores themselves which represented changes in readiness to accept job-related changes. The reliability of a difference score, as given in Appendix D, made use of the reliabilities of the pretest and posttest sets of scale scores², and the intercorrelation between the two scales. This data provided an estimate of the reliability of the difference score obtained from two total scores ($r = .42$).

From an accumulation of the above data, it was determined that the scale had a sufficiently high level of reliability. The scale was fairly stable, and the items comprising the scale were internally consistent.

Validation

Information concerning the construct validity of the Readiness for Change scale has already been provided. Extensive and rather convincing evidence for the validity of the scale was demonstrated by Trumbo (1958).

2. Estimates based on the analysis of variance approach.



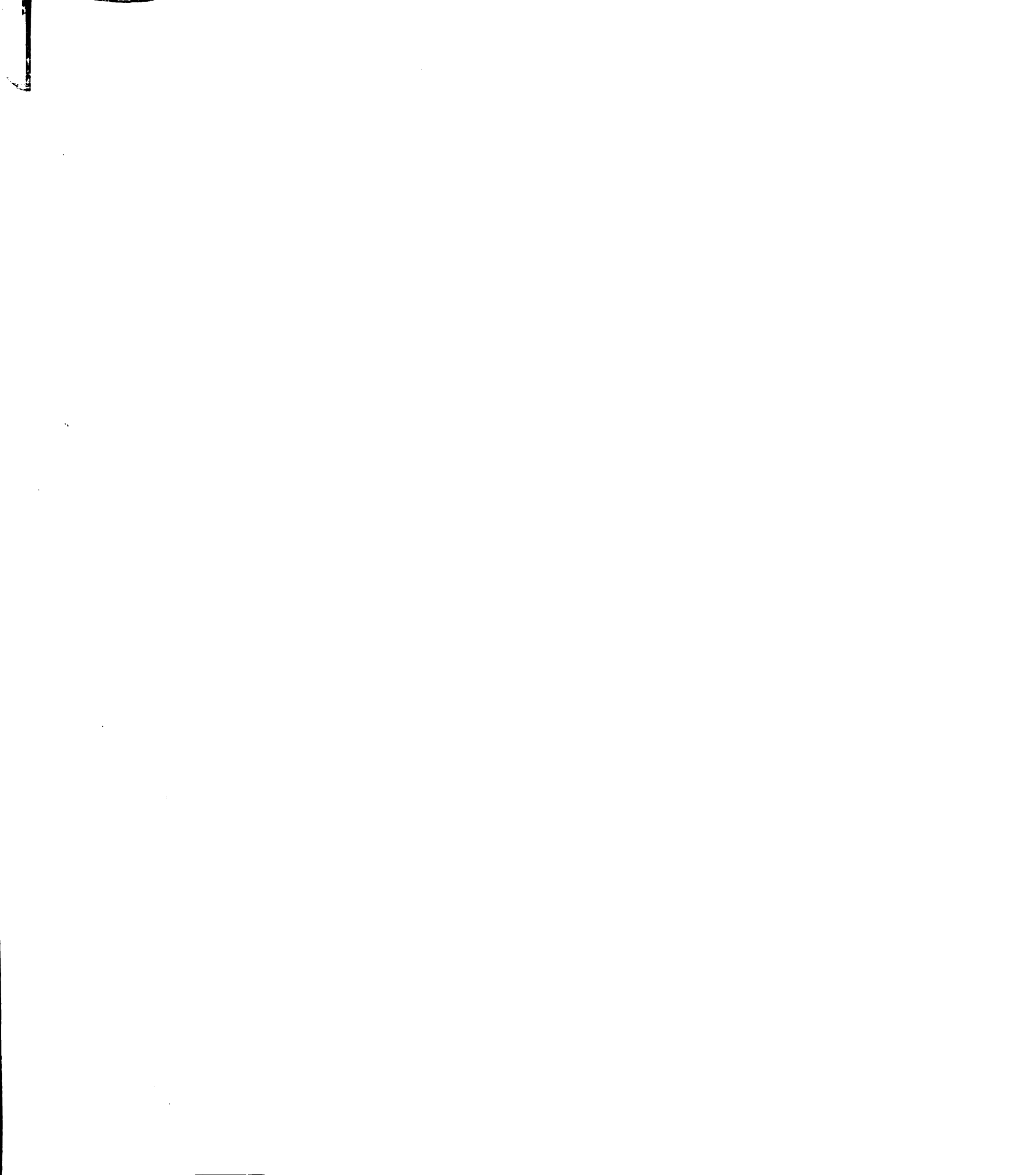
Trumbo was able to show that employees who responded favorably to current, past, or future changes in their jobs scored significantly higher on the Readiness for Change scale than did employees who responded unfavorably to such changes. He also demonstrated that workers who liked jobs which they perceived as having a change component, scored higher on the "Readiness" scale than did those who disliked such jobs as well as employees who liked jobs associated with a relatively low change component. Another finding which arose during the course of validating the scale was that employee preparation for change, through plans to take special training, was found to be positively related to the Readiness for Change scale.

Affective Response to the Computer

Just as Readiness for Change dealt with change as a general phenomenon inherent within the work setting, Affective Response to the Computer deals with change as a specific entity with a definite change-agent in focus. This dependent variable was defined as: the affective response toward the expected effects of the computer upon the employee.

Selection of items and construction of index

The measuring instrument for this main variable differs in some degree from those used to measure the other major independent and dependent variables. It does not represent a scale in the true sense of the word, but is more closely aligned to what may be thought of as a numerical indicator or index. This index was comprised of three separate attitude items written in the Likert format. These items were designed to



assess the degree of like or dislike for the IBM 650 computer and its effects as explained in Chapter Four. To mention the items again, they were II-52, 54, and 55 in both the supervisory and non-supervisory forms of the pretest questionnaire.

Scoring schema

The three items were scored according to the Likert method of assigning interval values of one through five to the five response classes so that the weight of "1" indicated "like it very much" and a weight of "5" indicated "dislike it very much." The actual response categories for all three items were:

1. I like it very much
2. I like it
3. It makes no difference to me
4. I dislike it
5. I dislike it very much

A discussion of the referents for these affective responses was given in Chapter Four.

A total score for the index was obtained by summing the individual scores for each item. The possible range of scores for the index ran from 3 to 15. A low score was indicative of positive response (liking) toward the computer, while a high score denoted a negative response (dislike) for the computer as a change agent.

Descriptive statistics of index

The original pretest respondent population of 283 cases had to be adjusted in a downward direction to account for terminal cases (N = 37) and for any omissions (N = 29) occurring. This provided a base working population of 217 cases. This figure underwent further reductions as

the index was related to other variables for which only N's smaller than 217 were available.

Below in Table 45 are presented descriptive statistics providing information on the characteristics of the Affective Response to the Computer index.

Table 45. Descriptive Statistics for Affective Response to the Computer Index (N = 217)

Statistic	Value
Score Range (actual)	3-15
Mean Score	7.17
Median Score	7.21
Standard Deviation	2.06
Skewness Index	+0.06
S.E. of Measurement ^a	1.09

^a based on analysis of variance estimate of r_{tt}

This section presents some evidence of index internal consistency as it existed for the three items.

Table 46 below provides information on item discrimination. Mean item scores were compared for upper and lower 27 per cent ($N_u = N_l = 68$) subgroups on the basis of composite total score distribution. Because the index was comprised of only three items, any one item separately would correlate quite highly with the total score of which it was a part. One way to adjust for such an inflation of r_{it} ³ due to spurious

3. r_{it} = item-total score correlation.

overlap was to calculate a set of composite total scores which in turn omitted the item in question (the one to be correlated with the total score) from calculation of the total score. Thus, when item II-52, for example, was correlated with the index composite total score, it was actually being correlated with only the total score derived from items II-54 and II-55.

Table 46. Item Analysis Data for the Affective Response to the Computer Index ($N_u = N_l = 68$)

Item	Mean Item Score		Diff	t	p ^a
	Upper 27%	Lower 27%			
1	2.90	1.93	0.97	7.14	<.01
2	3.18	1.84	1.34	11.53	<.01
3	2.56	1.65	0.91	6.29	<.01

^adf = 134

For each of the items, mean item scores differed significantly when upper and lower 27% subgroups on the basis of total score were compared.

Another approach to internal consistency was the derivation of average composite total scores for each item on each response alternate. A consistent increase in average total score was found as a function of item alternates responded to (one through five). The data showing these relationships is in Table 47 below.

Table 47. Mean Composite Total Scores as a Function of Item Alternates selected for each Item

Item	<u>Item Alternate Scoring Weights</u>				
	1	2	3	4	5
1	3.37	4.25	5.44	6.00	7.23
2	2.86	4.04	5.10	6.01	10.00
3	3.78	5.07	5.45	6.24	8.50

Item intercorrelations

Table 48 provides information about the extent to which the three index items were interrelated. It was expected, on a priori grounds, that item II-52(1) would correlate most highly with II-54(2), since these two items were more similar in terms of content than was item II-55(3). The average item intercorrelation was +.49.

Table 48. Item Intercorrelations¹ for the Affective Response to the Computer Scale

Item	2	3
1	+.62**	+.37**
2		+.47**

¹product-moment correlations.

**Significant at beyond .01 level, df = 216

Item-total score correlations

In estimating r_{it} , the problem of spurious overlap was discussed and a solution was offered in an earlier section. Rather than calculating a part-whole correlation, a part-remainder correlation was determined.

This was done by correlating an item score with the composite total score where the item in question was omitted from the calculation of the total score. There correlations are presented below in Table 49.

Table 49. Item-Total Score Correlations for the Affective Response to the Computer Index

Item	r_{it}
1	.58 ^{a**}
2	.66 ^{**}
3	.46 ^{**}

^a part-remainder product-moment correlations.

** Significant beyond .01 level.

The item analysis and other internal consistency checks provided evidence that this set of three items forms a fairly cohesive, internally consistent index.

Reliability

In determining the reliability of this index, the number of approaches which could be used was limited because of the small number of items in the index as well as the fact that the entire set of items were not repeated in the posttest administration to allow for a test-retest estimate of reliability.

The two methods which were used, however, provided reliability estimates as determined from the average item intercorrelation data and from the analysis of variance approach.

The average item intercorrelation procedure gave an estimate of .74 as the reliability (based on $r_{ij} = .49$) for the index. Hoyt's method provided an estimate of .72 for the index reliability. The data for the latter estimate is given below in Table 50.

Table 50. Analysis of Variance Estimate of Reliability for the Affective Response to the Computer Index

Source	Sum of Squares	df	Variance	r_{kk}
Persons	294.56	216	1.36	.72
Items	14.86	2		
Remainder	156.47	432	0.38	
total	474.89	650		

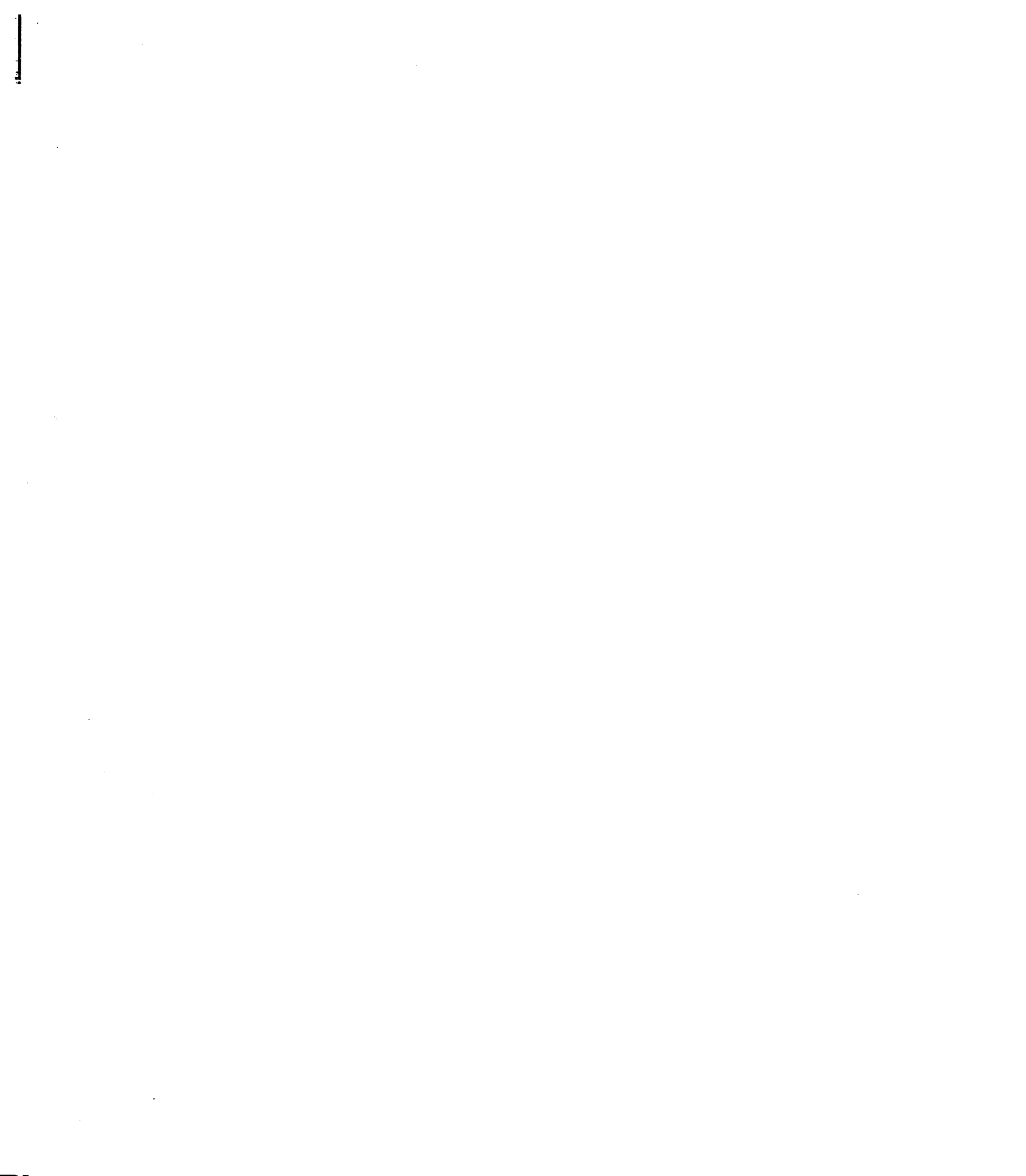
For a set of only three items, the two reliability estimates were fairly high. This is explained on the basis that the r_{ij} 's and r_{it} 's were all quite substantial. Such a reliability supports the contention that the index is sufficiently stable to be used as a measure of this dependent variable.

Validation

The construct or logical validity of this particular index serving as a dependent variable was supported by the following five predicted and confirmed relationships.

Effect of machines on job

The first relationship stemming from the construct subsumed under



the Affective Response to the Computer index deals with the interaction between response to the computer and response to the perception that machines are causing jobs to be done differently. Specifically, the association predicted was that employees liking the idea that machines will cause them to do their jobs differently (as compared to other jobs) would obtain significantly lower Affective Response to the Computer scores than would employees who dislike or are indifferent to the idea that machines will in some way alter the way their jobs are carried out. Remember, that for this index, a low score is coincident with a high liking for the computer and its effects, and a high score is indicative of dislike for the computer and its effects. Table 51 below confirms this hypothesis. Those who respond favorably toward the computer are also the ones likely to react positively to expectations that business machines of some sort will cause them to do different work in their jobs.

Table 51. Comparison of Mean Index Scores on Affective Response to the Computer for Groups based on Like-Dislike for Effects of Machines on Jobs

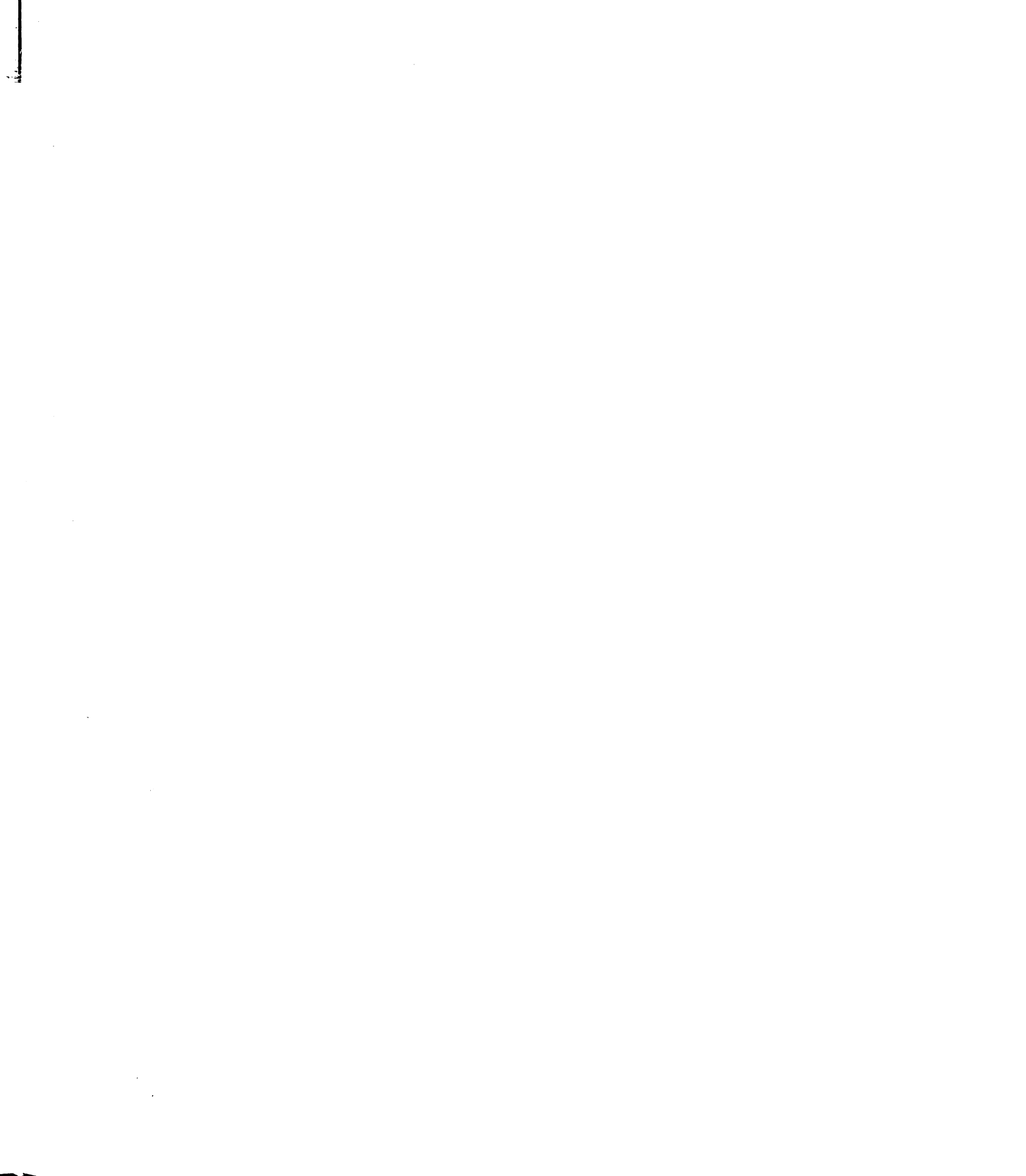
How do you feel about this? (I-51)	Response Category Greater Than for Most Jobs	
	Like	Indifferent or Dislike
N	51	28
Mean Index Score	6.12	8.25
$M_1 - M_2$		2.13
σ_{m_d}		.32
t^a		6.64
p^b		<.005

^a one-tailed test of significance

^b $df = n_1 + n_2 - 2 = 77$

Rate of Change

This particular variable was selected on the reasoning that differences in the way workers reacted to the perceived rate of changes would be reflected in variations in response to the computer. Tables 52 and 53 below show that, indeed, favorable reactions to the fact that the perceived rate of the introduction of changes, both in general and on the work scene, was rapid is related to specific affective response to the computer. Those employees liking the fact that changes were making their appearance at a relatively rapid rate obtained significantly higher "liking" scores when the computer was the referent. It was presumed



that a general feeling tone or attitudinal predisposition toward change exists which conditions explicit responses to concrete changes on the job.

Table 52. Comparison of Mean Index Scores on Affective Response to the Computer for Groups based on Like-Dislike for the Rate at which Changes are Taking Place

Check the one statement that best describes the rate at which changes are taking place in the world today. (I-40)		
	<u>Response</u> More Rapidly Than Before	
How do you feel about this? (I-41)	Like It	Dislike It
N	143	35
Mean Index Score	6.92	8.23
$M_1 - M_2$	1.31	
σ_{m_d}	.34	
t^a	3.84	
p^b	<.005	

^a one-tailed test of significance

^b $df = n_1 + n_2 - 2 = 176$

Table 53. Comparison of Mean Index Scores on Affective Response to the Computer for Groups based on Desirability of Rate of Technological Change

At what rate do you feel new developments in machines and methods for doing work are taking place? (I-43)	Response	
	Less Rapidly Than Desirable	More Rapidly Than Desirable
N	43	39
Mean Index Score	6.54	7.77
σ_m	.30	.28
$M_1 - M_2$	1.23	
σ_{m_d}	.41	
t^a	2.99	
p^b	<.005	

^aone-tailed test of significance

^bdf = $n_1 + n_2 - 2 = 80$

Specific job satisfaction

It was hypothesized that job satisfaction as applied to specific job aspects would be related to specific response to change. Table 54 points out an expected inverse relationship between these two variables. Those highly satisfied with specific aspects of their jobs were the ones who liked the computer and its expected effects, whereas employees dissatisfied with specific aspects of their jobs obtained significantly ($p = <.01$) higher index scores on Affective Response to the Computer, indicative of dislike for the computer and the expected effects.

Specific job satisfaction was measured by responses to items IV-53 to 66. To each one of fourteen job aspects (see Appendix F),

the respondents were asked to check how satisfied they were with it by placing a mark in one of five columns from "Completely satisfied" to "Not satisfied." A weight of "1" was assigned to "Completely satisfied," "2" to "Very satisfied," "3" to "Quite satisfied," "4" to "Somewhat satisfied," and "5" to "Not satisfied." These weights for the fourteen items (aspects) were then summated to give a total specific job satisfaction score. Scores ranged from 14 to 60. Two groups were formed from this score range, using the extremes. Group 1 reflected high satisfaction (14-29) and group 2 represented a high dissatisfaction (45-60) subgroup. Comparisons were then made on the basis of these two subgroups.

Table 54. Comparison of Mean Index Scores on Affective Responses to the Computer for Groups based on Specific Job Satisfaction

Place a check mark under the statement which best describes how satisfied you are with the aspect of your job. (IV-53 to 66)	Response	
	Satisfaction	Dissatisfaction
N	57	66
Mean Index Score	6.81	7.62
σ_m	.22	.19
$M_1 - M_2$	0.81	
σ_{m_d}	.29	
t^a	2.73	
p^b	<.005	

^a one-tailed test of significance

^b $df = n_1 + n_2 - 2 = 121$

Adjustment to change

In this examination of construct validity, an item from the posttest administration questionnaire was selected. If the Affective Response to the Computer index actually measured what its name implied, then the scores on the index should manifest a particular fluctuation when examined for groups which have been differentiated on the basis of self-assessed adjustment to the computer.

Respondents were asked, in item II-40, how long it took them to "get used to" the changeover to the computer's installation. The specific hypothesis was that employees quickly adapting to the changeover would show significantly lower mean index scores on Affective Response to the Computer than would those who responded that they were having difficulty adjusting to the changeover. Table 55 below indicates that this was the case. Persons who quickly got used to the computer liked it and its effects, while those who expressed some difficulty in this area disliked the computer and its effects.

Table 55. Comparison of Mean Index Scores on Affective Response to the Computer for Groups based on Acclimatization to the Changeover

How long would you say it took you to get used to the change? (II-40, posttest)	<u>Response</u>	
	No More Than One Week	Not Really Used to It Yet
N	29	32
Mean Index Score	6.72	8.12
$\hat{\sigma}_m$.39	.39
$M_1 - M_2$	1.40	
$\hat{\sigma}_{m_d}$.55	
t^a	2.56	
p^b	<.025	

^a one-tailed test of significance

^b $df = n_1 + n_2 - 2 = 59$

Job worth

This concerned a self-appraisal of the value of one's job and of one's performance in terms of perceived importance, recognition, and replacement value. There were four items in both supervisory and non-supervisory forms of the pretest questionnaire which were used as an index for "Job Worth." These items were V-73, 75, 76, and 77, and can be found in Appendix F. The job worth index was prepared by summing item scores for the four items in such fashion that a low score indicated high job worth and a high score was indicative of perceived low job worth.

It was predicted that those assessing themselves positively; i.e.,

perceiving themselves and their job as of relatively high worth to the company, would also obtain higher Affective Response to the Computer index scores than would a comparable group which was low in perceived job worth. This sort of covariation was predicted upon the basis that employees registering high job worth were relatively secure, at least psychologically, in their current jobs, and would in general welcome the challenges attendant with a major change. On the other hand, those expressing self-assessed low job worth were employees who, by their admittance of low worth were indicating a form of insecurity. These workers, rather than regarding the change as something favorable, would perceive it as an additional threat to their already jeopardized job security. Table 56 below supports this contention that high job worth was associated with liking for the computer and its effects, while low job worth was associated with dislike for the computer.

The data presented in this section attempted to supply some substantiation for the construct validity of the index. On the basis of this data, it is believed that the index does in fact measure fairly reliably and validly specific response to the computer in terms of like and dislike of the "650" and its expected upon the employee.

Table 56. Comparison of Mean Affective Response to the Computer Index Scores for Groups based Upon Perceived Job Worth

Statistic	Response	
	High Job Worth	Low Job Worth
N	67	24
Mean Score	6.33	7.62
σ_m	.22	.31
$M_1 - M_2$		1.30
σ_{m_d}		.38
t^a		3.40
p^b		<.005

^a one-tailed test of significance

^b $df = n_1 + n_2 - 2 = 68$

CHAPTER EIGHT

EMPIRICAL SELECTION OF THE INTERVENING VARIABLES

It has been pointed out that one of the serious hazards involved in field studies within naturalistic settings is the uncontrolled presence of factors which influence the obtained relationship between dependent and independent variables. Too frequently these extraneous variables are not recognized and isolated, nor are they properly taken into account in subsequent analyses.

Two specific problems are posed by this situation; namely, how can one isolate and identify the intervening variables whose effects should be controlled for, and how is this control to be achieved. The procedures outlined in this chapter represent the efforts to resolve the first problem mentioned. The solution to the second problem will be discussed in detail in Chapter Nine.

We have already reviewed the a priori selection of the secondary factors resident within the research setting. These variables were "visible" in the sense that they were either inherent components of the work-force and environment, or were measurable responses of experimental subjects.

The variables initially examined were described in greater detail in Chapter Four. It will be noted that one potentially important secondary variable was not dealt with. This was sex. Because of the highly uneven ratio of male to female employees, any subsequent multiple analyses of covariance would have, if they accounted for breaks on sex, presented very difficult problems in terms of small

or missing cell entries.

The efforts to isolate those secondary factors which were significantly related to the main experimental variables took the form of utilizing statistical procedures to screen through the initial set of intervening variables. This screening process involved ascertaining if a relationship existed between intervening variables and the main variables.

The screening procedure permitted the experimenter to arrive at an empirically determined set of four intervening variables which were in fact found to be significantly related to the dependent and independent variables.

The reader will be provided with an explicit example of this screening procedure for one of the main variables, as well as a summary of the results for all screening. Appendix B presents the statistical data concerning the screening procedures for the other main variables.

The Method

The instrumentality for the implementation of this screening process was a factorial analysis of variance technique.

It was believed desirable to make use of some technique which would provide an estimate of relationship between proposed variable measures as well as, if possible, entail the economy of a factorial design because of the many relationships to be examined. Another important consideration at the time of the screening, was a lack of knowledge as to whether all the variable measures were amenable to scaling, or whether they were going to be normally distributed.

For some of the secondary variables, such as location and occupational level, the distributions were obviously bipolar in nature. In light of the limited knowledge of the underlying quantitative properties of the measures, a technique was sought which, if possible, would combine a factorial design with a non-parametric approach.

A perusal of the literature soon turned up a statistical procedure reported by Wilson (1956). The method permitted a use of counts or score-frequencies within given categories; i.e., in this case the number of subjects obtaining scores above and below the median on a series of measures. As Sutcliffe stated, "there is no logical hindrance to the use of factorial experimentation with these phenomena" (1957, p. 134). In this context, then, frequencies were treated as "scores."

Both Wilson (1956) and Sutcliffe (1957) presented a means of treating frequency data in a factorial design by use of the chi-square test. Their procedures called for a partitioning of the total X^2 into components for main effects and interactions for an $AxBxC$ design, along with appropriate degrees of freedom. Such a decompartmentalization of total X^2 and degrees of freedom provided independent, additive components attributable to the main and interaction effects.

The technique as reported by Wilson and Sutcliffe underwent further modification, or more precisely, generalization. The basic premise upon which this generalization was based was that contingency association is the analogue of interaction in analysis of variance. The method for assessing multiple contingency frequency data was an adaptation of the F test to a distribution-free situation. Sheffield (1957) regarded cell frequencies as "scores," then performed the usual two-way classification

analysis on these "scores." A breakdown was made into row, column, and row x column interaction sums of squares with appropriate degrees of freedom. Within-cell variance was used as the error term.

Two assumptions underlying the F test were taken into consideration. For each multiple contingency table for which an F was obtained, Bartlett's test of homogeneity of variance (Edwards, 1950) for groups with unequal n's was used.¹ Since, on the variable measures, a number of subgroupings were used, it was assumed that for the variables in question there was normality of distribution for the original parent populations.

Groupings on variable measures

The entries in the multiple contingency tables, which formed the "raw data" for carrying out the screening process, were score frequencies for natural or arbitrarily arrived-at categories based upon the total distributions. In order to construct contingency tables which were fairly manageable from the standpoint of the number of cross-breaks involved, variable measures were reduced to either two, or at the most, three score-range subgroupings. In the case of location and occupational level, only two subgroupings could be used. However, in a number of instances a three-way categorization of variable measures was possible. In general, for each variable measure, the total score distribution was divided into upper, lower, and middle thirds. In several instances the score frequency distribution provided cues as to where cut-off points could occur.

1. This became important when we wished to pool higher-order interaction sums of squares.



Application of the method - an example

The example chosen concerns the independent variable, Degree of Informed Awareness. It was selected because, of the possible secondary variables which might have been related to the major variables, three of them were actually found to be related to this particular independent variable.

Before showing the analyses, groupings on the appropriate measures will be given. For these, see Table 57 below.

Table 57. Score Groupings on Variable Measures used in Analysis of Variance Multiple Contingency Tables

Variable	Subgroup	Score Range (if appropriate)	Interpretation
<u>Main</u>			
Degree of Informed Awareness	I	3-5	Poorly informed
	II	6-8	Moderately informed
	III	9-11	Well informed
<u>Intervening</u>			
Level	I		Supervisory
	II		Non-supervisory
Office	I		Home office
	II		Branch office
Communicative contacts	I	1-3	Few contacts
	II	4-6	Many contacts
Expected involvement	I	1-4	Expect to be affected
	II	5-7	Expect not to be affected
	III	9	Dcn't know
Tenure	I	1-2	Hire date 1956-1957
	II	3-5	Hire date 1953-1955
	III	6-7	Hire date 1947-1952
Education	I	1-5	Some education through 11th grade
	II	6	Completion of high school
	III	7-9	College educated
Age	I	1-2	Under 20 to 29 years of age
	II	3-4	30 to 49 years of age
	III	5-6	50 to 60 and above

(Table continued on the next page)

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Subsidiary

Supervisory

Realization
expectation

Table 57. Score Groupings on Variable Measures used in
Analysis of Variance Multiple Contingency Tables

Variable	Subgroup	Score Range (if appropriate)	Interpretation
<u>Subsidiary</u>			
Supervisory style	I		Democratic-Ideocratic
	II		Intermediate
	III		Autocratic-bureaucratic
Realization of expectations	I	0-13	Most expectancies met
	II	14	Many expectancies met
	III	15-25	Some expectancies met
	IV	26-44	Few expectancies met

Three variables were examined in any one analysis, providing an $A \times B \times C$ factorial design. More specifically, configuration ranged from a $2 \times 2 \times 3$ design, to a $3 \times 3 \times 3$ design, or to a $3 \times 3 \times 2$ design.

Replication was not used, hence sums of squares for higher order interactions were used to obtain an estimate of the error variance. In some cases the mean squares along with their associated degrees of freedom, were pooled for higher order interactions if evidence provided by Bartlett's test supported the assumption that respective mean squares for the interactions were estimates of the same common variance. If higher order (first-order and second-order) interactions were found to be not significant, they were pooled to give an estimate of the variance for within groups. This meant that in some cases only the second-order interaction ($A \times B \times C$) was used as an error term,² while in other circumstances, the second-order interaction was pooled with first-order interactions ($A \times B$, $A \times C$, or $B \times C$) if they were not significant, and if homogeneity of variance had been demonstrated.

The tables in sequence below provide data on the results of the screening procedure applied to the secondary variables and one independent variable. When the analysis was concluded, three of the intervening factors had been found to be related to the independent variable. These were: communicative contacts, expected involvement, and occupational level.

2. An assumption with an $A \times B \times C$ design without replication is that the second-order interaction is not significant, and can be used as an estimate of the error mean square which would have been obtained with replication.

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Table 58.1. Multiple Contingency Table for Degree of Informed Awareness x Tenure x Age showing Frequencies of Obtained Scores

Tenure (B)	Age (C)	Degree of Informed Awareness (A)		
		(3-5)	(6-8)	(9-11)
	(1-2)	29	27	5
(1-2)	(3-4)	1	5	3
	(5-6)	1	0	0
	(1-2)	15	18	7
(3-5)	(3-4)	5	13	4
	(5-6)	2	3	0
	(1-2)	5	13	6
(6-7)	(3-4)	5	26	9
	(5-6)	0	10	4

Table 58.2. Analysis of Variance for Degree of Informed Awareness x Tenure x Age

Source	Sum of Squares	df	Mean Square	F ^a	p ^b
A	342.88	2	171.44	9.28	<.01
B	6.89	2	3.44	0.19	NS
C	612.66	2	306.33	16.58	<.01
A x B	146.20	4	36.55	1.98	NS
A x C	181.77	4	45.44	2.46	NS
B x C	413.76	4	103.44	5.59	<.01
<u>A x B x C</u>	<u>147.84</u>	<u>8</u>	18.48		
Total	1852.00	26			

^aBartlett's test: $\chi^2 = 4.35$, $df = 3$ for interactions, $p = NS$, H_0 accepted.

^bSame results obtained when pooled interactions were used as the error term.

Table 59.1. Multiple Contingency Table for Degree of Informed Awareness x Office x Education showing Frequencies of Obtained Scores

Office (B)	Education (C)	Degree of Informed Awareness (A)		
		(3-5)	(6-8)	(9-11)
Home	<u>(1-5)</u>	2	4	1
	<u>(6)</u>	20	69	26
	<u>(7-9)</u>	1	26	8
Branch	<u>(1-5)</u>	7	2	0
	<u>(6)</u>	25	10	1
	<u>(7-9)</u>	8	5	2

Table 59.2. Analysis of Variance for Degree of Informed Awareness x Office x Education

Source	Sum of Squares	df	Mean Squares	F ^a	p ^b
A	528.77	2	264.38	2.52	NS
B	522.72	1	522.72	4.99	NS
C	1643.44	2	821.72	7.84	<.05
A x B	816.78	2	408.39	3.90	NS
A x C	339.23	4	84.81	0.81	NS
B x C	584.78	2	292.39	2.79	NS
A x B x C	419.22	4	104.81		
<u>total</u>	<u>4854.94</u>	<u>17</u>			

^a Bartlett's test: $\chi^2 = 2.56$, $df = 3$ for interactions, $p = NS$, H_0 accepted.

^b Same results obtained when pooled interactions were used as the error term.

Table 60.1. Multiple Contingency Table for Degree of Informed Awareness x Communicative Contacts x Supervisory Style

Communicative Contacts (B)	Supervisory Style (C)	Degree of Informed Awareness (A)		
		(3-5)	(6-8)	(9-11)
(1-3)	<u>(A)</u>	32	15	2
	<u>(B)</u>	3	2	1
	<u>(C)</u>	9	1	3
(4-6)	<u>(A)</u>	11	56	17
	<u>(B)</u>	3	15	2
	<u>(C)</u>	2	24	12

Table 60.2. Analysis of Variance for Degree of Informed Awareness x Communicative Contacts x Supervisory Style

Source	Sum of Squares	df	Mean Squares	F	p ^a
A	506.33	2	253.16	3.08	NS
B	304.22	1	304.22	3.71	NS
C	1044.33	2	522.16	6.36	NS
A x B	918.78	2	459.39	5.30	NS
A x C	277.34	4	69.34	0.84	NS
B x C	36.78	2	18.39	0.22	NS
A x B x C	328.22	4	82.06		
<u>total</u>	<u>3416.00</u>	<u>17</u>			

^a Results differed when pooled interactions were used for the error term; see Table 60.3 below.

Table 60.3. Analysis of Variance for Degree of Informed Awareness x Communicative Contacts x Supervisory Style using Pooled Interactions as the Error Term¹

Source of Variation	Sum of Squares	df	Mean Square	F	p ^b
A x B	918.78	2	459.39	7.15	<.05
Pooled Interaction	642.34	10 ^a	64.23		
A x C	277.34	4	69.34	0.43	NS
Pooled Interaction	1283.78	8	160.47		
B x C	36.78	2	18.39	0.12	NS
Pooled Interaction	1524.34	10	152.43		

¹Main effects (A, B, or C) were not examined in this manner, because of the lack of meaning for these effects in the analysis.

^adf = sum of degree of freedom for the constituent interactions which were pooled.

^bBartlett's test: $\chi^2 = 5.74$, df = 3 for interactions, p = NS, H₀ accepted.

Table 61.1. Multiple Contingency Table for Degree of Informed Awareness x Occupational Level x Expected Involvement

Level (B)	Involvement (C)	Degree of Informed Awareness (A)		
		(3-5)	(6-8)	(9-11)
Supervisory	<u>(1-4)</u>	0	5	3
	<u>(5-6)</u>	5	20	10
	<u>(9)</u>	1	2	0
Non-supervisory	<u>(1-4)</u>	14	29	5
	<u>(5-6)</u>	26	46	18
	<u>(9)</u>	16	13	3

Table 61.2. Analysis of Variance for Degree of Informed Awareness x Occupational Level x Expected Involvement

Source	Sum of Squares	df	Mean Square	F ^a	p ^b
A	506.33	2	253.16	29.57	<.01
B	854.22	1	854.22	99.79	<.01
C	739.00	2	369.50	43.16	<.01
A x B	210.78	2	105.39	12.31	<.05
A x C	221.53	4	55.38	6.47	<.05
B x C	56.78	2	28.39	3.32	NS
A x B x C	34.22	4	8.56		
<u>total</u>	<u>2622.86</u>	<u>17</u>			

^a Bartlett's test: $\chi^2 = 4.51$, $df = 3$ for interactions, $p = NS$, H_0 accepted.

^b Same results obtained when pooled interactions were used as the error term.

There are several points concerning the above set of tables and their preparation which require explanation.

In all cases where multiple contingency tables of score frequencies were constructed, and all of these involved an $A \times B \times C$ factorial design, a further set of subtables were prepared from which $A \times B$, $A \times C$, and $B \times C$ second-order interactions were calculated.

With respect to the degrees of freedom employed in these analyses of variance, all first-order interaction df 's were determined by the product of the degrees of freedom for the variables involved in the particular interaction. Second-order interaction degrees of freedom were determined by the product of all of the df 's for the constituents. The total degrees of freedom were formed by a summation of the degrees of freedom associated with all of the main effects, first-order interactions, and second-order interactions.

Attention in the screening process centered upon the interactions, which in this case provided evidence of a relationship between a major variable and secondary variables. Since cell entries were frequencies of obtained scores on the basis of two or three-way breaks, the main effects, per se (A , B , or C) were merely indicative of the manner in which scores on one of the three variables distributed themselves in either of two or three score-categories. Significance of a main effect as found in the analyses of variance only meant that there existed an appreciable difference between the frequency of scores in one category as opposed to the frequency of scores in another category for a particular variable. As a result of this interpretation given to the main effects, they were essentially neglected from further consideration.

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This was the case when pooled interactions were used. These pooled interactions were utilized only to reexamine interactions, but not main effects.

While Appendix B provides all of the data for the screening of secondary factors as relevant to the remaining major variables, Table 62 below shows the results of these other screening procedures in terms of F tests. It will be seen that office, communicative contacts, and expected involvement were significantly related to two of the other major variables. None of the conditioner factors were found to be related to Change in Readiness for Change, however.

Table 62. Summary of Results for Screening Procedures as applied to other Main Variables (Entries = F Values)

Main Variables	Tenure	Age	Office	Educa- tion	Con- tacts	Level	In- volve- ment	Realiza- tion of Ex- pectations
Belief- Disbelief in Commu- nications	1.21	2.25	11.11*	2.16	5.83*	2.48	3.12	0.37
Change in Readiness for Change	0.68	1.01	1.00	2.37	3.72	2.10	0.97	
Affective Response to the Computer	0.13	1.36	0.59	3.42	0.58	0.27	26.73**	

*Significant at .05 level

**Significant at .01 level

On the basis of the results of this pragmatic means of identifying those secondary variables which are related to the dependent and independent variables, adjustments were made for these latter variables. Such adjustments took the form of partialling out the effects of relevant secondary variables from the relationship between dependent and independent variables. This was done by using a multiple classification analysis of covariance which is discussed in the next chapter.

CHAPTER NINE

TREATMENT AND ANALYSIS OF THE DATA

This chapter is concerned with an attempt to explore the extent to which the independent and dependent variables were related as specified in the major hypotheses set forth in Chapter Five.

As the last chapter described, a screening procedure yielded four secondary variables which were significantly related to the major variables. These were:

<u>Main Variable</u>	<u>Secondary Variable</u>
Degree of Informed Awareness	Communicative Contacts Expected Involvement Occupational Level
Belief-Disbelief in Communications	Communicative Contacts Office
Affective Response to the Computer	Expected Involvement

Because uncontrolled fluctuation in any or all of these relevant intervening factors may have operated to directly influence the relationship between dependent and independent variables, some means was required to either hold the effects of these secondary variables constant, or to partial out their effects altogether. In this instance, statistical control was being substituted for control which would have been provided by a true experimental design. In the naturalistic setting within which the investigation was conducted, no steps could be taken to obtain the kind of rigorous control thought desirable.



The most appropriate statistical methodology available seemed to be analysis of covariance. Since, in any one examination of a major hypothesis, at least two secondary variables were involved, a multiple analysis of covariance was called for.

A complete discussion of the analysis of covariance, along with examples, can be found in the works of Edwards (1950) and Goulden (1939). Unfortunately, these authors only considered designs providing both replication and equal n's for subgroups. The multiple analyses of covariance in this study, however, involved a design where no replication was possible, nor were there equal n's for treatments. Because of these complicating factors, consultation¹ was sought as to the best way to proceed with such an analysis.

The results of all multiple analyses of covariance are summarized in this chapter, although the statistical treatment of the data itself is found in Appendix C.

There was a total of four analyses of covariance corresponding to the testing of each one of the major hypotheses. For every analysis, there were at least five variables involved: the dependent and independent variable, and three variables whose effects upon the major variables were being partialled out.

Cell entries in these analyses were scores on the dependent variable and secondary variables. Treatments were subgroupings on the basis of score-range categories for the independent variable. In those analyses

1. Statistical advice was obtained from Dr. W. D. Baten, Research Professor, Department of Agricultural Economics, and statistician for the Michigan Agricultural Experiment Station, Michigan State University.

involving Change in Readiness for Change, pretest scores on the Readiness for Change scale were used in the design to adjust the "Change" scores for variations on the initial set of Readiness for Change scores. This had the effect of holding constant initial readiness for change so that deviations over time in readiness for change were taken from the same base for all subjects; i.e., respondents were "matched" on initial Readiness for Change so that deviations reflected actual, relative differences between subjects in their increase or decrease in acceptance of general job-related change.

Table 63 shows the variables used in the analyses of covariance as well as the treatments based upon independent variable measurements. The multiple analysis of covariance, in partialling out the effects of various secondary variables, was in effect making adjustments in the treatment means for variations in the secondary variable-measures found empirically related to the major variables.

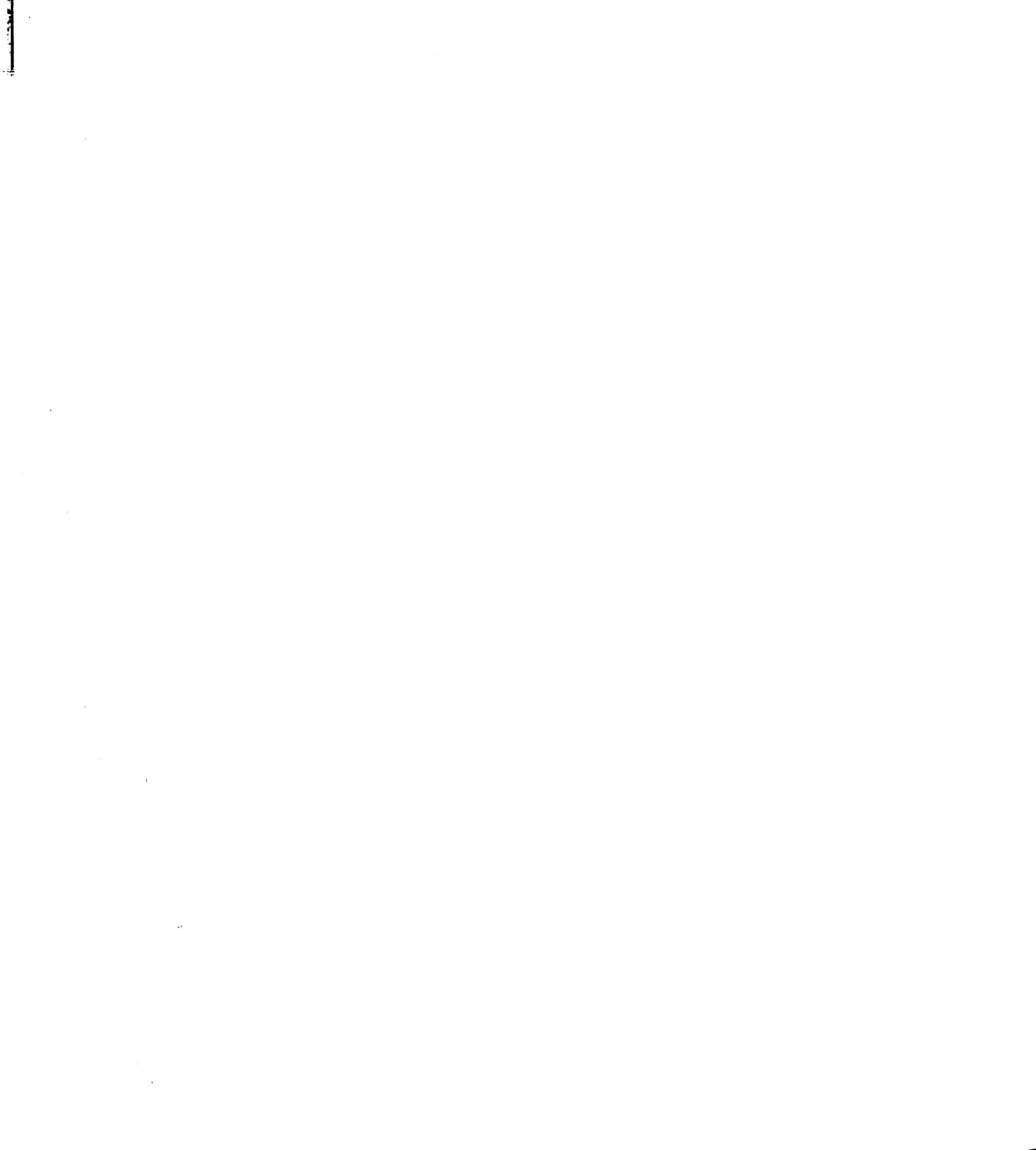
Table 63. Design of Multiple Analyses of Covariance

Analysis (Dependent Variable)	Treatments (Independent Variable)	Variables used for Adjustment
I Change in Readiness for Change	Degree of Informed <u>Awareness</u> 3-5 6-7 8-11	Expected Involvement Communicative Contacts Occupational Level Initial Readiness for Change score
II Affective Response to the Computer	Same as I	Expected Involvement Communicative Contacts Occupational Level
III Change in Readiness for Change	<u>Belief-Disbelief in Communications</u> 1-11 12-15 16-26	Communicative Contacts Office Initial Readiness for Change score
IV Affective Response to the Computer	Same as III	Expected Involvement Communicative Contacts Office

Results accruing from a testing of Hypotheses I, II, III, and IV (as stated in Chapter 5) by means of multiple analyses of covariance are presented below in summary form. The complete set of data for each hypothesis will be found in Appendix C.

Table 64. Summary of Results from Multiple Analyses of Covariance used in testing Hypotheses

Hypothesis	F Value	Significance
I	0.88	NS
II	0.31	NS
III	4.62	< .05
IV	1.06	NS



As one can quickly see, only Hypothesis III was confirmed. The analysis of covariance supported Hypothesis III by providing evidence that Belief-Disbelief in Communications was in fact related to changes in Readiness for Change ($F = 4.62, p = < .05$). However, the data for both observed and adjusted treatment means suggested that the relationship may be a complex one. Those employees who disbelieved what they thought they had been told by management obtained significantly lower Change in Readiness for Change (RFC) scores; that is, over a period of time they tended to become less ready to accept general change as a part of their job. Those obtaining very high scores on the Belief-Disbelief scale became, over a six month period, somewhat less ready to accept change, but not to the extent of the high disbelievers. Employees who obtained intermediate scores on the "BD" scale had the highest mean scores on the Change in Readiness for Change scale. Those employees who both believed and disbelieved some of what they perceived as having been told them by management remained essentially unchanged in their receptiveness to change relative to both high believers and high disbelievers. High believers did, however, obtain slightly higher Change in Readiness for Change scores than the high disbelievers.

Whereas the analysis of covariance examined the possibility of a relationship between belief or disbelief in company communications and changes in one's readiness to accept change when adjustments were made for relevant secondary variables, a straightforward analysis of variance might throw light upon the effectiveness of the multiple analysis of covariance. If there is a difference in findings between the analyses of covariance and variance, then it is presumed that the covariance approach



revealed a "purer" estimation of the actual relationship obtaining between the independent and dependent variables. A finding of no difference would suggest that the selected secondary variables did neither contribute to, or artificially mask, the actual relationship between the main variables. Such an analysis was done, using four treatments based upon "ED" scores. The results are reported in Table 65.

Table 65. Analysis of Variance for Belief-Disbelief in Communications and Change in Readiness for Change

Source	Sum of Squares	df	Mean Square	F	p
Between	372.28	3	124.09	3.94	<.01
Within	<u>7026.73</u>	<u>223</u>	31.51		
Total	7399.01	226			

Essentially, the same results were secured, although the obtained difference reached a higher level of significance ($p = <.01$). Figure 4 shows a graphic representation of the relationship between scores on the two variable measures.

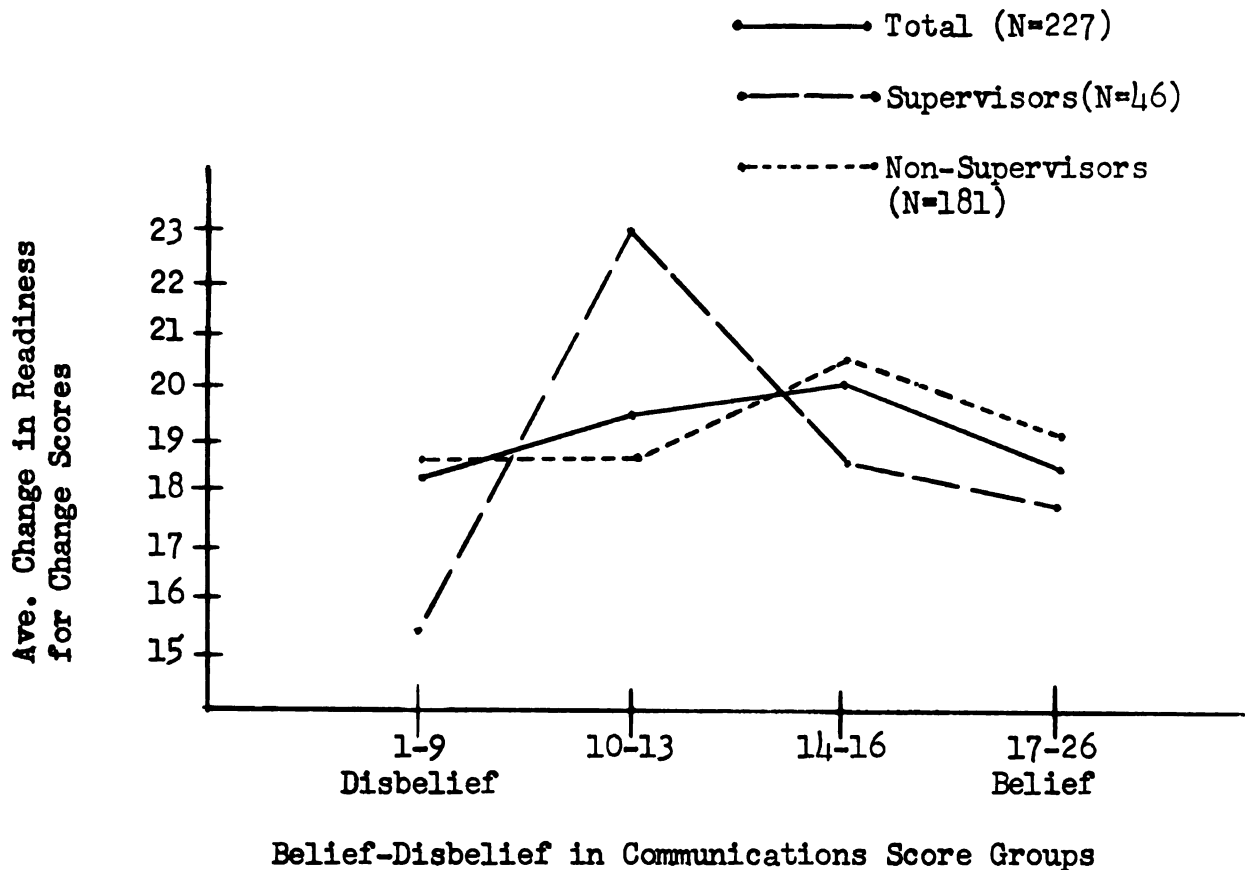


Fig. 4. Relationship between "BD" scores and average Change in Readiness for Change scores for total group and subgroups.

The rather striking divergence of the supervisory subgroup from the total and non-supervisory "profiles" is very probably a fluctuation arising from the small n's (5, 10, 10, and 21 respectively) available for determining the average Change in Readiness for Change scores. The same general finding held for the total group and non-supervisory subgroup with respect to the relationship between the two variables. Some evidence to support the contention that the relationship was linear came from the calculation of an eta coefficient (correlation ratio)

and chi-square test of linearity.² This test ($\chi^2 = 6.06$, $df = 11$, $p = NS$, where $r = .17$) suggested that the complete regression of Change in Readiness for Change scores on Belief-Disbelief scores was in fact linear.

Two further steps were taken on the basis of the established relationship between belief-disbelief and alterations in one's readiness to accept changes. If scores on the "BD" scale actually predict changes in readiness to accept change to the extent that disbelief and belief in communications were associated with decreased readiness to accept change, and intermediate scores were associated with essentially no change in readiness to accept change, then "BD" scores would more likely be related to posttest "RFC" scores than to pretest "RFC" scores. Tables 66 and 67 suggest that more confidence can be placed in "BD" scores being related to posttest "RFC" scores than to pretest "RFC" scores.

Table 66. Analysis of Variance for Belief-Disbelief in Communications and Pretest Scores on Readiness for Change

Source	Sum of Squares	df	Mean Square	F	p
Between	143.15	2	71.58	1.74	NS
Within	<u>9237.76</u>	<u>224</u>	41.24		
Total	9380.91				

2. See the formulae provided in Appendix D.

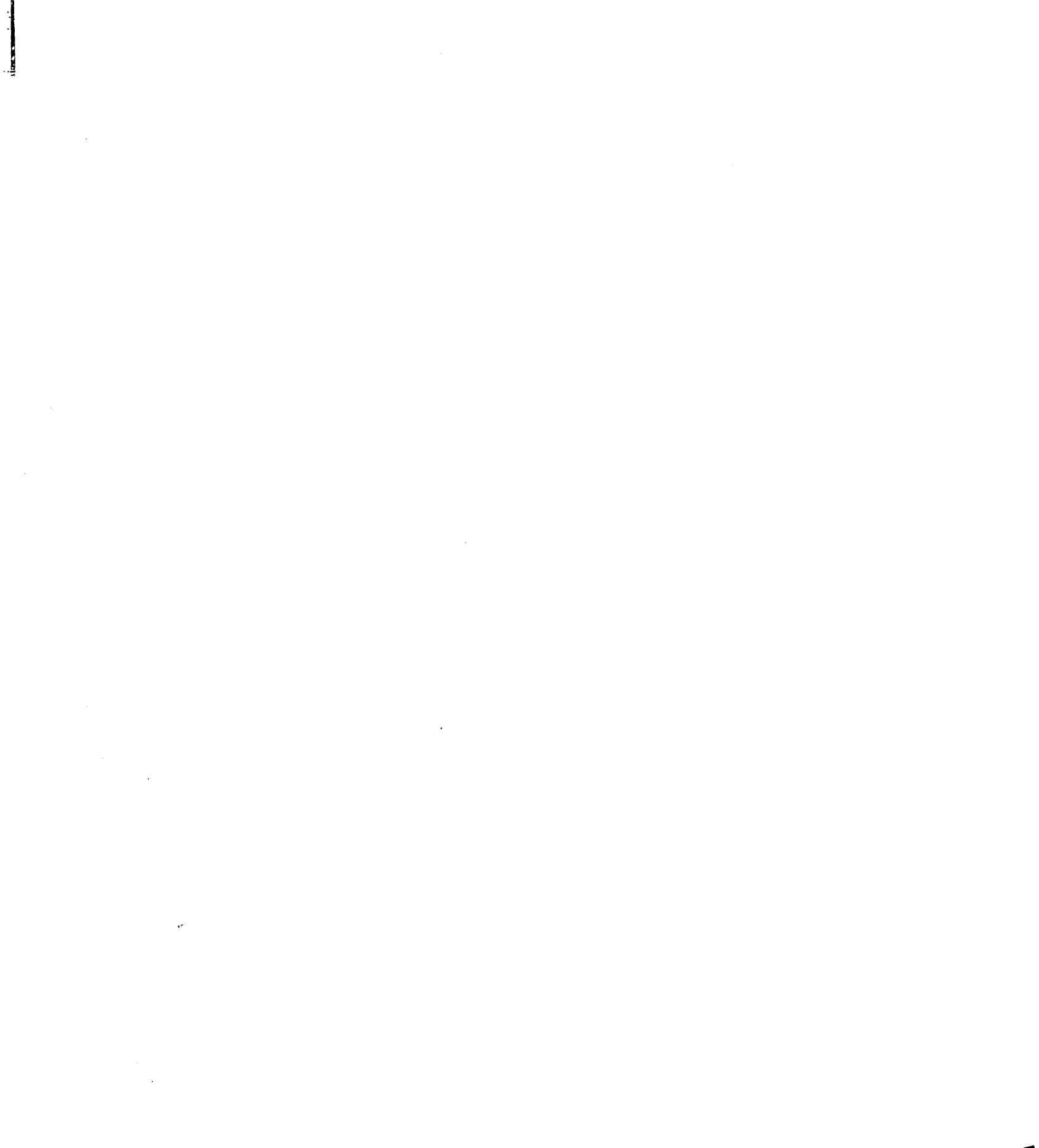


Table 67. Analysis of Variance for Belief-Disbelief in Communications and Posttest Scores on Readiness for Change

Source	Sum of Squares	df	Mean Square	F	p
Between	358.27	2	179.14	4.99	<.01
Within	<u>8048.32</u>	<u>224</u>			
Total	8406.59	226			

Below are the results of analyses of variance for both Hypotheses I and II.

Table 68. Analysis of Variance for Degree of Informed Awareness and Change in Readiness for Change

Source	Sum of Squares	df	Mean Square	F	p
Between	7.82	2	3.91	0.12	NS
Within	<u>6658.11</u>	<u>211</u>	31.56		
Total	6665.93	213			

Table 69. Analysis of Variance for Degree of Informed Awareness and Affective Response to the Computer

Source	Sum of Squares	df	Mean Square	F	p
Between	10.36	2	5.18	1.20	NS
Within	<u>842.35</u>	<u>195</u>	4.32		
Total	852.71	197			

These results, coupled with the findings from the multiple analyses of covariance, for Hypotheses I and II suggest strongly that the degree to which an employee was factually informed about the impending change-over had nothing to do with either immediate and specific response to the computer, or with subsequent and slowly evolving alterations in general response to change as an inherent job component. Neither of these two kinds of response to technological change could be predicted on the basis of scores on the Degree of Informed Awareness scale. Apparently, knowledge about a change, at least in this instance, did not condition or influence affective responses toward the change-agent itself, nor were differential amounts of factual knowledge held by employees about a change related to an increase or decrease in their general readiness to accept or resist the dynamic quality of work. In the latter instance the factual knowledge disseminated to employees was primarily favorable and optimistic in tone. It was earlier reasoned that those knowledgeable about the change would have been influenced in a positive way by such information, and consequently would have become generally more accepting and ready for change in the job. This was not born out by the results of the study.

An analysis of variance for Hypothesis IV is presented below. The multiple analysis of covariance had failed to support the hypothesis that Belief-Disbelief in Communications was positively related to index scores on Affective Response to the Computer ($F = 1.06$, $p = >.05$).

Table 70. Analysis of Variance for Belief-Disbelief in Communications and Affective Response to the Computer

Source	Sum of Squares	df	Mean Square	F	p
Between	49.41	3	16.47	4.12	<.01
Within	823.76	206	3.99		
Total	873.17	209			

The data in Table 70 appear to suggest that in a much less rigorously controlled setting, from a statistical point of view, belief or disbelief in communications about the change might be positively related to specific response of an affective nature toward the computer. However, in comparing this result with that found in the analysis of covariance, the proper interpretation would seem to suggest otherwise. When the relevant secondary variables (expected involvement, office, and frequency of contacts with sources of information) were permitted to fluctuate uncontrolled, they interacted with the main variables in such fashion as to give rise to or enhance the measured estimate of relationship between "ED" scores and response to the computer. In this context it would appear, then, that such intervening factors were quite important contributors to any relationship obtained between these two main variables.

The complete regression of Affective Response to the Computer scores on "ED" scores was found to be linear ($r = .08$; test of linearity: $\chi^2 = 7.15$, $df = 10$, $p = NS$).

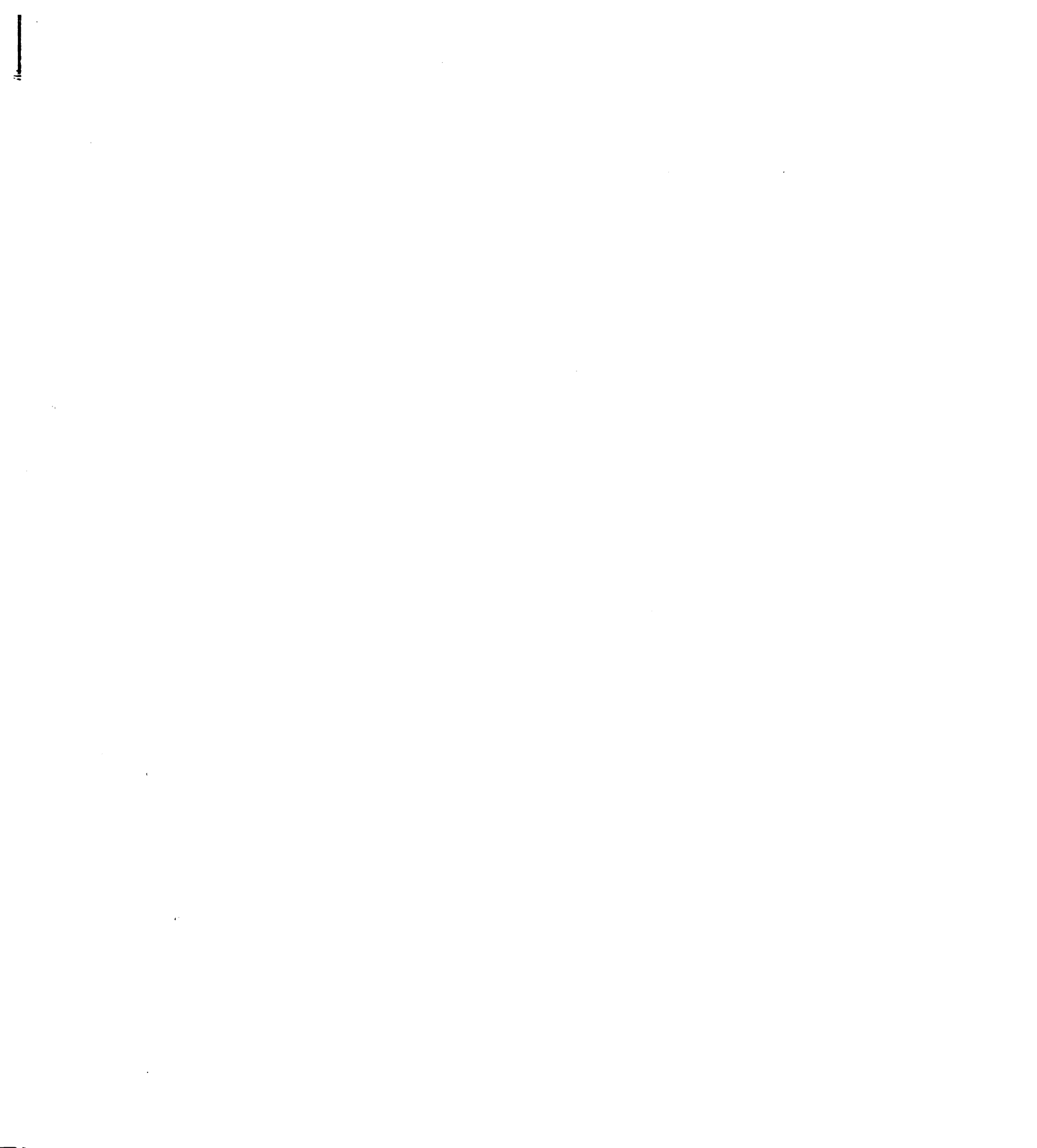


Figure 5 below provides graphic information about the relationship between the main variables for Hypothesis IV for the total response population and for subgroups based upon four score-range categories on the "BD" scale.

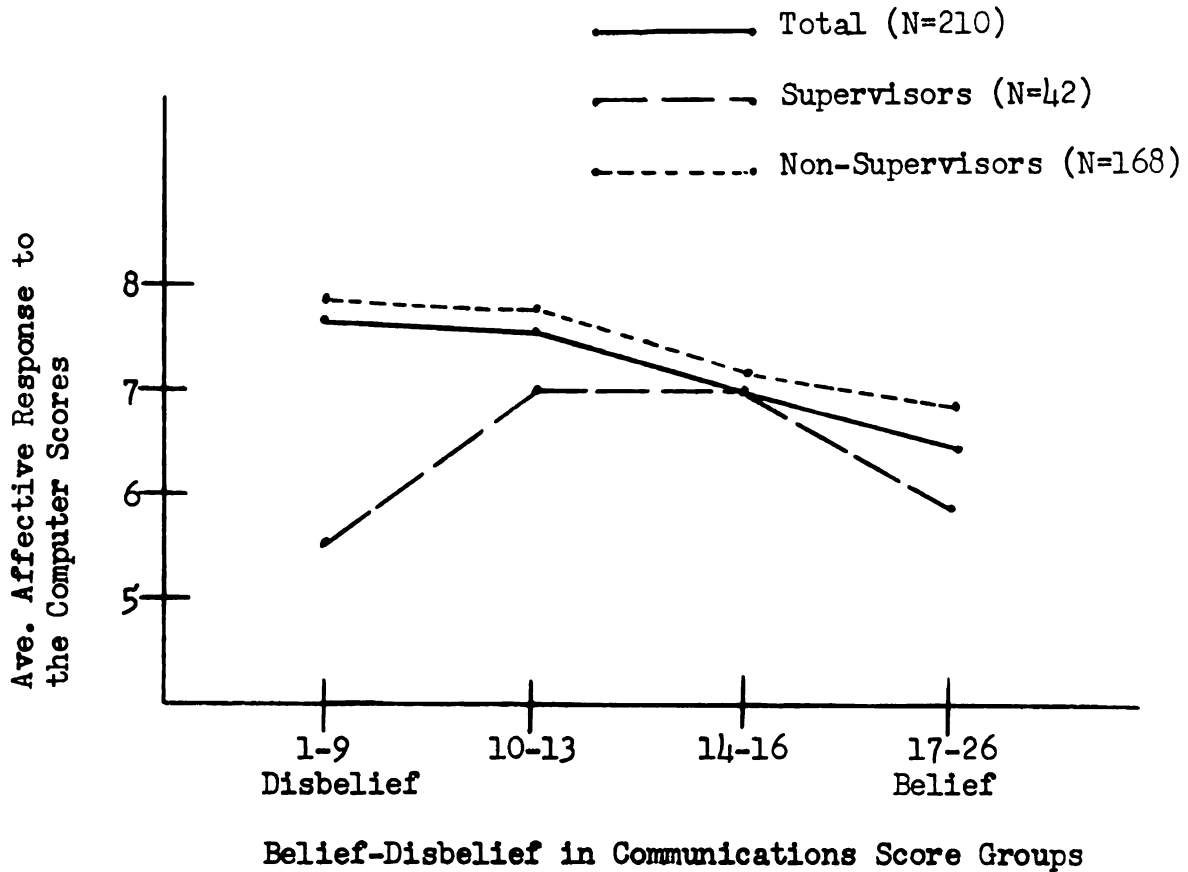


Fig. 5. Relationship between "BD" scores and average Affective Response to the Computer index scores;



For the total group and non-supervisory subgroup, the relationship between belief-disbelief and response to the computer was fairly linear. The discrepancy shown by the supervisory subgroup was probably a function of the instability in means arising from small group n's (4, 9, 10, and 19 respectively). It would be incongruous, indeed, for those who were most extreme in their disbelief of what they had been told to manifest the strongest liking for the computer as compared to other subgroupings on the Belief-Disbelief scale.

Intercorrelations for main variables

In order to answer the question, to what extent were the main variable measures interrelated?, the following table of intercorrelations was prepared.

Table 71. Intercorrelations¹ between the Major Experimental Variables

Variable	Belief-Disbelief in Communications	Change in Readiness for Change	Affective Response to the Computer
Degree of Informed Awareness	+ .35**	+ .02	- .15*
Belief-Disbelief in Communications		+ .03	- .21**
Change in Readiness for Change			+ .11

¹Pearson product-moment correlations

*Significant at .05 level

**Significant at .01 level

These intercorrelations were calculated on the basis of total N's varying in size from 197 to 227. All total scale score distributions on the variables were essentially normal.

As one can see, the table of intercorrelations presents data which to some degree is at variance with earlier findings. For example, a just-significant negative relationship ($r = -.15$, $p = < .05$, $N = 197$) was found between Degree of Informed Awareness and Affective Response to the Computer. This relationship, which was in the expected direction, had not been found in either the multiple analysis of covariance or in the analysis of variance for these two variables. Additionally, a non-significant Pearson $r(+.03)$ was obtained between "BD" scores and Change in Readiness for Change. This was in contradistinction to the findings of both the multiple analysis of covariance and analysis of variance. A significant $r(-.21)$ was obtained between the "BD" scale scores and Affective Response to the Computer. This latter relationship was in agreement with the analysis of variance (see Table 70), but at odds with the finding from the multiple analysis of covariance.

By way of explanation, it seems plausible that we have here what amounts to further evidence that findings are to a large degree a function of the coarseness or refinement of statistical technique in terms of the control of "extraneous" factors as they impinge upon the interrelation between main variables. The Pearson r 's were calculated on the basis of an uncontrolled examination of the relationships, whereas the multiple analyses of covariance were based upon the controlled investigation of the relationships where the influence of relevant conditioner variables was eliminated. Such a difference may mean that in one in-

stance secondary variables, allowed to vary without control, assisted in creating a significant relationship between level of informed awareness and response to the computer ($r = -.15$). This same difference may also mean that in the case of belief-disbelief in communications and changes in readiness for change ($r = +.03$), relevant intervening variables were interacting with the major variables in such fashion so as to mask the "true" relationship between the main variables as uncovered by the multiple analysis of covariance.

Some of the discrepancy may be associated with the differences in the formation of subgroups. In the analyses of variance and covariance, there were either two or three subgroups used based upon score intervals of from 2 to 11 score points. In the correlations, however, there were as many groups as there were discrete score values for the variable measures.

There is the problem of the correlation of homogeneous or heterogeneous groups of subsamples. Both figures 4 and 5 strongly suggest that the subgroups made up of supervisory personnel was rather divergent from the non-supervisory subgroups. This was thought to be a result of the small n 's involved. Regardless of the cause, it appears as if the subsamples (supervisors and non-supervisors) represent heterogeneous groups. As such, depending upon within and between correlations for the subsamples, and upon the respective means on X and Y for the subsamples, the composite total group correlation may be excessively high or low.

The next chapter will discuss in some detail the implications of the findings as reported here, as well as present some conclusions arising from them.

CHAPTER TEN

DISCUSSION OF RESULTS AND CONCLUSIONS

The contents in this final chapter distribute themselves generally into four areas: a summary and discussion of the results, conclusions drawn from the study, implications for future investigations, methodology, and suggestions for the implementation of change programs.

The results permit discussion from two frames of reference, hypothesis-testing and the efficacy of the statistical techniques utilized. While the results of testing hypotheses were presented in earlier chapters, they have yet to be viewed as an aggregate.

In order to place the results in some perspective, let us address ourselves to the original questions posed in the Introduction.

Main Variable Relationships

Two basic questions had been asked as reflected in the four major hypotheses I, II, III, and IV. The first question was, does the act of being factually informed about a change bear some direct relationship to either immediate or subsequent response to change? In the study, of course, two distinct kinds of response to change were examined. The results (see table 64) indicated that such a question, at least based upon this research, had to be answered in the negative. Those employees who were knowledgeable about the upcoming installation of the computer, as mediated through formal management statements, did not manifest any

greater liking or dislike for the computer and its expected effects than did those who were poorly informed about the impending change, nor did the better informed workers alter over time in their readiness to accept general job-associated changes to a degree different from the unknowledgeable employees. Varying responses to change, then, could not be differentiated on the basis of the degree of informed awareness.

Knowledge, per se, did not seem to be related to an attitude about the object of that knowledge. Factual information in and of itself contributed little or nothing to the etiology of particular change attitudes. It is suggested that the particular change attitudes under examination were ones which just were not related to the variable, Degree of Informed Awareness. Perhaps other indices of response to change would be influenced by the degree of knowledge held about the change. Another possibility is that the information program as implemented did not represent sufficiently influential communications in the sense that they did not seem to have an effect upon attitudes toward change as measured.

One could speculate that perhaps specific items in the "Degree-Informed" scale, reflecting potentially crucial kinds of information, might individually bear a relationship to responses to change. The differential prediction of responses to change based upon such a conception would require each item in the scale to be weighted according to its actual correlation with a specified attitude-toward-change measure. In this sense the set of information items would be treated like a battery of tests, where weights assigned to each item would serve to maximize the correlation of the total "Degree-Informed" scale with a measure of response to change.

A communications program may well function much in the same way as does pay in relation to job satisfaction (Herzberg, et. al., 1957); i.e., it serves as a factor in contributing to negative attitudes, but is not effective in creating positive attitudes. To this degree, the presence or lack of a communications program may contribute differentially to an attitude about the object of the communications. That is, an information program does not contribute substantially to the creation of positive reactions to the change, but if the program were missing altogether, or if it were improperly handled, it might contribute significantly to the development of negative response to the change.

The question arises, does the act of being informed have an effect upon anything? Subjects did differ considerably in the extent to which they were informed, as measured by the Degree of Informed Awareness scale. These differences in turn were found to be related to belief-disbelief in communications, and were associated with differences in such factors as communicative interaction and perceived location within the communications structure of the company.

In retrospect, to have optimized the opportunity for a relationship to appear between the Degree of Informed Awareness and responses to change, it would have been advantageous to have had a pre-measure of attitudes toward change prior to the start of the company's information program. Such a measure could have been compared to response to change measures obtained after the information program had been concluded (equivalent to our pre-test administration). Shifts or changes in response to change could then be examined in light of variations in Degree of Informed Awareness. In this instance, any shift in attitude toward change would have a greater

probability of actually being associated with the information program.

The second question was whether a specified response to the communications themselves would bear some relationship to responses to change. The results suggested that an affective reaction to formal communications (in terms of belief-disbelief in individual statements) was related to changes in readiness for change. The nature of the relationship between Belief-Disbelief in Communications and Change in Readiness for Change suggested that resistance to change could be predicted from the "BD" scores, but perhaps not ready acceptance of change. High disbelief of what one was thought to have been told was related with a relative decrease in readiness to accept change, while high belief in what one was told did not necessarily lead to an increase in readiness for change as a generalized feature of the job. In fact, it was very likely to be associated with a decrease in "RFC" scores over time.

It was interesting to note that the employees who were intermediate in their belief of what they were told, being neither high believers or high disbelievers, were the ones to shift the least in their attitudes about accepting change in the job. This "ambivalent" subgroup, which apparently reacted selectively to company pronouncements, were the ones who maintained a fairly constant attitude toward acceptance of general change in their jobs relative to either the high believer or high disbeliever subgroups. This intermediate group perhaps represented a sampling of a larger population of persons who typically react with moderation, manifesting their presence by stability in reacting to the world about them - in this instance, to a set of attitude items directly and to change indirectly.

We have as yet to account for the fact that both the high belief and high disbelief subgroups decreased in their general acceptance of change over time. Those who were high disbelievers are likely to be rejecting, apprehensive, resistant, and dogmatic types of individuals. These persons are likely to be disbelieving of a great deal, including the premise that the computer was highly efficient and would not have harmful consequences for employees. Those who were high believers, however, presented (hypothetically) another picture. These persons are perhaps what might be termed "high-assimilators" - they readily accepted practically anything the company told them. Persons in such a group are more likely to see things turn out differently from the way they had been led to believe. This disillusionment might lead to a decrease in their willingness to accept changes at a later date. Preparatory communications which build up optimistic opinions might have the effect, if they were believed, of making people more resistant to subsequent changes, if all the favorable expectations were not met and fulfilled.

A comparison of the relationship between "BD" scores and both the pretest and posttest Readiness for Change scale scores revealed the same general sort of relationship between high believer, high disbeliever, and intermediate subgroups. "BD" scores were significantly ($p = <.01$) related to the posttest "RFC" scores, but not to the pretest "RFC" scores. It should be mentioned that the high belief group obtained somewhat higher scores on the "RFC" scale than did the high disbelief subgroup.

Belief in communications was related with lower (like) scores on the Affective Response to the Computer index, while disbelief in communications was related to higher (dislike) scores on the same index. Employees

believing what they thought they were told were more positive in their reaction to the computer and its expected effects than were workers who did not believe what they thought they had been told by the company. It will be recalled, however, that this relationship was not statistically significant for a multiple analysis of covariance, but was significant when a straight analysis of variance was performed. This suggested that perhaps in the latter analysis, uncontrolled variations in expected involvement, contacts with communications, and/or location may have interacted with the main variables in such a way as to enhance and strengthen an otherwise weak relationship between belief-disbelief and reactions of like or dislike toward the computer.

When both sets of data were taken together, (see Figures 4 and 5) they presented an apparent inconsistency. The high-belief group in one case registered a slight decrease in readiness to accept job changes, and in another instance liking for the computer and its effects. This represented a "between-analyses" kind of examination. Within each analysis the high-belief group, in comparison to the high-disbelief subgroup, obtained a difference in score on the response to change measures in the expected directions.

The "between-analyses" inconsistency, however, may be, to a great extent, a function of differences between the two kinds of response to change. The fact that change in Readiness for Change was correlated with Affective Response to the Computer to the extent of .11 suggested that each tapped a fairly independent facet of response to change. Whatever configuration of factors was responsible for a pretest attitude of liking

of the computer and its effects was apparently not the same as the one responsible for a change or shift in readiness for change, or at the very least the factors operated differently. Apparently a group (the high-believers) can have an initially positive response to a particular object of change (or change-agent), and yet over time display some decrease in their willingness to accept changes as an inherent characteristic of the job. It is hypothesized that the high-believers, since they expressed confidence in management's pronouncements about the change, would naturally perceive the change in a favorable light. At the same time the high-believers were thought to be a group which perhaps tended typically to believe too much, and who over time did not see all of their expectations materialize, hence responding by decreased readiness to accept change as a part of the job.

It should be mentioned that the high-disbelief subgroup, in comparing "ED" scores for the two kinds of response to change, were consistent in their responses. This particular subgroup had the lowest mean score on the Change in Readiness for Change scale as well as the highest mean score on the Affective Response to the Computer index. The high-disbelievers not only decreased in their readiness for change over time, but also before the change took place, they did not like the computer and its expected effects as much as the other subgroups.

Secondary Variable Relationships

With respect to an empirical exploration of the relevancy of a set of seven secondary variables selected on an a priori basis, four were found significantly related to dependent and independent variables. Communicative contacts, expected involvement, and occupational level were all

related to the Degree of Informed Awareness in the hypothesized directions (see Chapter Five). Both office and communicative contacts were related to Belief-Disbelief in Communications, and expected involvement was related to Affective response to the Computer. These were all in the hypothesized directions.

A somewhat surprising finding was that none of the seven secondary factors were related significantly with Changes in Readiness for Change. It appears possible that none of these particular factors acted in such a way as to condition the shift in readiness to accept or reject change as part of the job. Parenthetically, it might be added that investigations by Trumbo (1958) and Faunce (1960) had found a significant relationship between levels of education and measures on the Readiness for Change scale. No relationship was obtained by this investigator when an association was examined between Change in Readiness for Change and a posttest index of involvement in the changeover (see item II-45 in the posttest questionnaire, Appendix F).

Another rather surprising result, or lack of result, was the fact that neither age, tenure, nor education were found to be significantly related to any of the main experimental variables as was originally hypothesized. Apparently these personal-data variables had no effect on the dependent or independent variables. Another investigator¹ had failed to isolate a relationship between either age or tenure and Readiness for Change.

1. From a personal correspondence with D. A. Trumbo, Kansas State University, who was preparing an article for publication based upon a portion of his doctoral dissertation.

To summarize the major findings with regards to the intervening or secondary variables, it was found that employees who were relatively well informed about the impending changeover to the computer were characterized from the poorly informed workers in the following ways. They had had a greater frequency of contacts with sources of information, they functioned generally in a supervisory capacity, and were expecting to be personally involved in the changeover.

Those who believed what they were told by management, as opposed to those who disbelieved what they were told, were likely to be employees from the home office rather than the branch, and were also likely to have had a greater number of contacts with sources of information about the change.

Employees who responded favorably to the computer and its expected effects, by both liking what they expected to occur and the fact that a computer was to be installed, were also the ones who thought that they would be personally affected in some way by the use of the computer.

Construct Validation Relationships

Another category of findings involved the relationships discovered while attempting to substantiate the logical or construct validity of the major variables.

It was found, for example, that those who were knowledgeable about the impending change interacted with others in terms of discussing the issue to a greater extent than did those who were not as knowledgeable. Additionally, those who were well informed perceived themselves as centrally located within the company communications network, were satisfied

with communications, and responded to the questionnaire with significantly fewer "don't-know" responses.

Employees who believed most or all of what they thought they were told were less likely to be dogmatic personality types, were generally satisfied with their jobs, and expressed confidence in both the company and supervision in terms of looking after the best interests of the employee.

The dependent variable, Affective Response to the Computer, was found to be associated significantly with specific job satisfaction (based on satisfaction with fourteen job factors) in a direction suggesting that insurance workers who liked the idea of a computer being installed and its attendant effects were satisfied with specific aspects of their jobs. Likewise, those expressing positive attitudes toward the computer liked the idea that machines cause jobs to be done differently, liked the perceived fact that the rate of change in the world was rapid, and thought that the rate of technological change should be more rapid than it was. The group liking the computer, as opposed to those disliking it believed that, in retrospect, they adjusted very quickly to the changeover. The former group also expressed a perceived worthwhileness and importance of themselves and their jobs.

Statistical Methodology

Another and final, although certainly of major relative importance, set of results was concerned with the statistical methodology used in the study. These results are more properly in the form of an evaluative statement regarding their efficacy in uncovering relationships and in accomp-

lishing a degree of statistical control over relevant secondary factors.

The technique used to screen out the relevant conditioner variables from among the initially chosen factors was of questionable use. It, first of all, is admittedly not as powerful a device as a regular analysis of variance F test in detecting effects.² Additional to this, however, is the economy involved. The method requires quite a bit of time, although one needs to remember that two secondary variables could be examined with any one of the main variables simultaneously. A total of four such analyses were required for any one major variable. A number of chi-square tests would have been required to be equivalent to the four analyses of variance for each main variable. It is an unanswered question whether the chi-square method would have required more or less time than that required by the analyses of variance.

There is much to recommend the multiple analysis of covariance, however. The usefulness of this particular method appeared to be relatively clear-cut. In a naturalistic setting where a rigorous experimental design with its attendant control is not attainable, the multiple analysis of covariance was able to exert a statistical form of control over the empirically relevant secondary factors. As an example of the comparative difference such an analysis can make, the reader will recall the results pertaining to Belief-Disbelief in Communications and Change in Readiness for Change. In this case, the multiple analysis of covariance found an association between the two variables which was significant at the .05 level, whereas an analysis of variance found the same association significant at the .01 level. In another example, there was no significant

2. For a discussion of this, see McNemar (1957).

relationship found between Belief-Disbelief in Communications and Affective Response to the Computer via the multiple classification analysis of covariance. However, when an analysis of variance was performed, the relationship was found to be significant at the .01 level of confidence.

Both examples tend to suggest that the multiple analysis of covariance is more stringent in its isolation of relationships which would be termed significant. This attribute is presumed to reflect the application of limitations by such an analysis through the partialling out of relevant or extraneous factor-effects which act to either mask or enhance any "true" relationship obtaining between the dependent and independent variables. The method, once one becomes familiar with it, is fairly straightforward. It does entail extended computation time which would readily be reduced if such an analysis, including the solving of sets of simultaneous equations to determine regression weights, could be programmed for computer processing. Such analyses could then be carried out at a much increased rate for research data obtained from naturalistic settings.

From the examples given above, it can be seen that if we had settled upon only the results accruing from an analysis of variance, the research findings would have been somewhat different than those predicated upon multiple analysis of covariance results. This by itself argues for use of the more sophisticated methodology.

It would appear, from the above discussions, that this study has met the goals as originally set forward. The interaction of empirically determined secondary variables with both employee responses to change and with the independent variables was explored. Control was subsequently exercised for such intervening factors. We have assembled a



general picture of the way in which employee knowledge about changes, and reactions to communications conveying this knowledge, were related to change attitudes. Factors which seemed to concomitantly vary with differential response to change and with varying degrees of knowledge and response to communications were also examined. This took the form of a pattern or constellation of variables interwoven in relationship with the main variables. The investigation has confirmed or rejected a number of specific hypotheses as set forth in Chapter 5.

In reference to the findings, it should be stressed that they are tentative from the standpoint of generalizing to other industries or populations. Some systematic replication in other experimental sites would be required as well as repetition in the presence of other combinations of variables to ascertain how far these initially found relationships can be generalized.

Implications

There would seem to be some implications in this study with respect to the implementation of a change program. It is perhaps predominantly a waste of time merely informing employees about proposed changes if the object is primarily to promote positive expectancies and attitudes towards the change. Being informed may surely contribute to more efficient job performance, but it doesn't seem to signify much in the area of attitude modification, at least in this instance.

A more fruitful approach to the creation of positive attitudes concerning a specific change may well lie in the area of promoting general employee trust and confidence in the company, its pronouncements, and in

the way it implements changes. This was not accomplished through this communications program, unfortunately. In order to do this, the company should behave in such a manner so as to create an image, through action, whereby the employee views his company in terms of its sincere efforts to be fair and look after the best interests of the employees.

The evidence accumulated in this study suggested a complex relationship between belief or disbelief in what the company said about a change and consequent resistance to or acceptance of change. Those extreme in either belief or disbelief were more likely to manifest over time a decrease in readiness to accept generalized change in the job. Those who exercised some discrimination in terms of both believing and disbelieving some of what they were told, indicated no particular shift in their readiness for change. Measures on the "BD" scale may have some potential as a predictor of subsequent resistance to change, but it is highly doubtful as a predictor of temporally contiguous or simultaneously specific reactions to a change.

It would be interesting to further examine high, intermediate, and low belief subsamples in an effort to further differentially characterize them in terms of specific expectations about changes and their subsequent realization, personality factors, and on other change attitudes. From the data on validation it seemed apparent that Belief-Disbelief in Communications is one facet of a general factor of "job confidence."

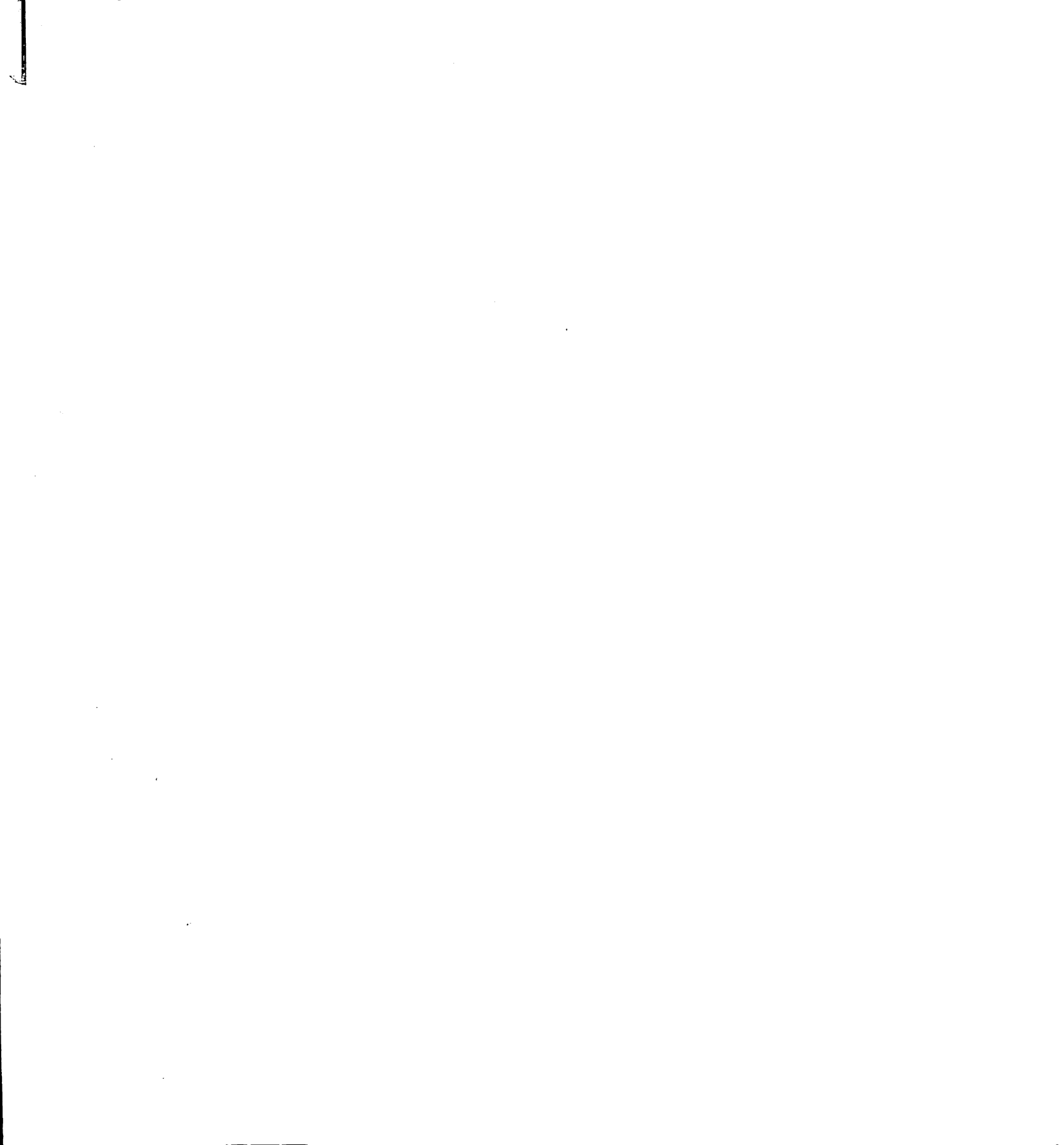
Lastly, the more frequent use of multiple analyses of covariance in industrial psychological and sociological research would seem to be a wise course to pursue for the many reasons cited in the study.

In this investigation, then, an attempt was made to explore particular kinds of relationships in a setting of change with particular emphasis on the effects of intraorganizational communications and response to these communications upon both immediate and subsequent attitudes towards change.

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APPENDIX A

Table 72. Item and Total Scores on the Main and Secondary Variables

Subject	Item	Score	Total	Item	Score	Total
1	1	1	1	1	1	1
1	2	1	2	2	1	2
1	3	1	3	3	1	3
1	4	1	4	4	1	4
1	5	1	5	5	1	5
1	6	1	6	6	1	6
1	7	1	7	7	1	7
1	8	1	8	8	1	8
1	9	1	9	9	1	9
1	10	1	10	10	1	10
1	11	1	11	11	1	11
1	12	1	12	12	1	12
1	13	1	13	13	1	13
1	14	1	14	14	1	14
1	15	1	15	15	1	15
1	16	1	16	16	1	16
1	17	1	17	17	1	17
1	18	1	18	18	1	18
1	19	1	19	19	1	19
1	20	1	20	20	1	20
1	21	1	21	21	1	21
1	22	1	22	22	1	22
1	23	1	23	23	1	23
1	24	1	24	24	1	24
1	25	1	25	25	1	25
1	26	1	26	26	1	26
1	27	1	27	27	1	27
1	28	1	28	28	1	28
1	29	1	29	29	1	29
1	30	1	30	30	1	30
1	31	1	31	31	1	31
1	32	1	32	32	1	32
1	33	1	33	33	1	33
1	34	1	34	34	1	34
1	35	1	35	35	1	35
1	36	1	36	36	1	36
1	37	1	37	37	1	37
1	38	1	38	38	1	38
1	39	1	39	39	1	39
1	40	1	40	40	1	40
1	41	1	41	41	1	41
1	42	1	42	42	1	42
1	43	1	43	43	1	43
1	44	1	44	44	1	44
1	45	1	45	45	1	45
1	46	1	46	46	1	46
1	47	1	47	47	1	47
1	48	1	48	48	1	48
1	49	1	49	49	1	49
1	50	1	50	50	1	50
1	51	1	51	51	1	51
1	52	1	52	52	1	52
1	53	1	53	53	1	53
1	54	1	54	54	1	54
1	55	1	55	55	1	55
1	56	1	56	56	1	56
1	57	1	57	57	1	57
1	58	1	58	58	1	58
1	59	1	59	59	1	59
1	60	1	60	60	1	60
1	61	1	61	61	1	61
1	62	1	62	62	1	62
1	63	1	63	63	1	63
1	64	1	64	64	1	64
1	65	1	65	65	1	65
1	66	1	66	66	1	66
1	67	1	67	67	1	67
1	68	1	68	68	1	68
1	69	1	69	69	1	69
1	70	1	70	70	1	70
1	71	1	71	71	1	71
1	72	1	72	72	1	72
1	73	1	73	73	1	73
1	74	1	74	74	1	74
1	75	1	75	75	1	75
1	76	1	76	76	1	76
1	77	1	77	77	1	77
1	78	1	78	78	1	78
1	79	1	79	79	1	79
1	80	1	80	80	1	80
1	81	1	81	81	1	81
1	82	1	82	82	1	82
1	83	1	83	83	1	83
1	84	1	84	84	1	84
1	85	1	85	85	1	85
1	86	1	86	86	1	86
1	87	1	87	87	1	87
1	88	1	88	88	1	88
1	89	1	89	89	1	89
1	90	1	90	90	1	90
1	91	1	91	91	1	91
1	92	1	92	92	1	92
1	93	1	93	93	1	93
1	94	1	94	94	1	94
1	95	1	95	95	1	95
1	96	1	96	96	1	96
1	97	1	97	97	1	97
1	98	1	98	98	1	98
1	99	1	99	99	1	99
1	100	1	100	100	1	100

APPENDIX B

APPENDIX B

Screening Procedures for Secondary Variables

1. Belief-Disbelief in Communications

The subgroupings on the variable measure for use in the multiple contingency tables were:

<u>Group</u>	<u>Score range</u>	<u>Interpretation</u>
I	1-11	Disbelief
II	12-15	Ambivalence
III	16-26	Belief

Table 73.1. Multiple Contingency Table for Belief-Disbelief in Communications x Tenure X Age showing Frequencies of Obtained Scores

Tenure(B)	Age(C)	Belief-Disbelief (A)		
		(1-11)	(12-15)	(16-26)
	<u>(1-2)</u>	28	15	26
(1-2)	<u>(3-4)</u>	4	2	3
	<u>(5-6)</u>	1	0	0
	<u>(1-2)</u>	19	17	9
(3-5)	<u>(3-4)</u>	5	8	11
	<u>(5-6)</u>	2	2	1
	<u>(1-2)</u>	10	8	8
(6-7)	<u>(3-4)</u>	7	12	21
	<u>(5-6)</u>	5	8	3

Table 73.2. Analysis of Variance for Belief-Disbelief in Communications x Tenure X Age

Source	Sum of Squares	df	Mean Square	F	p ^a
A	6.74	2	3.37	0.26	NS
B	3.62	2	1.81	0.14	NS
C	778.30	2	389.15	29.89	<.01
AxB	63.25	4	15.81	1.21	NS
AxC	117.23	4	29.31	2.25	NS
BxC	506.36	4	126.59	9.72	<.01
AxBxC	104.13	8	13.02		
Total	1579.63	26			

^a Bartlett's test: $\chi^2 = 9.101$, $df = 3$ for interactions, $p = <.05$, H_0 rejected. Pooling of interactions not warranted because of lack of homogeneity of variance.

Table 74.1. Multiple Contingency Table for Belief-Disbelief in Communications x Office x Education showing Frequencies of Obtained Scores

Office(B)	Education(C)	Belief-Disbelief(A)		
		(1-11)	(12-15)	(16-26)
Home	(1-5)	1	5	4
	(6)	36	44	43
	(7-9)	6	11	19
Branch	(1-5)	8	0	2
	(6)	24	11	7
	(7-9)	6	2	7

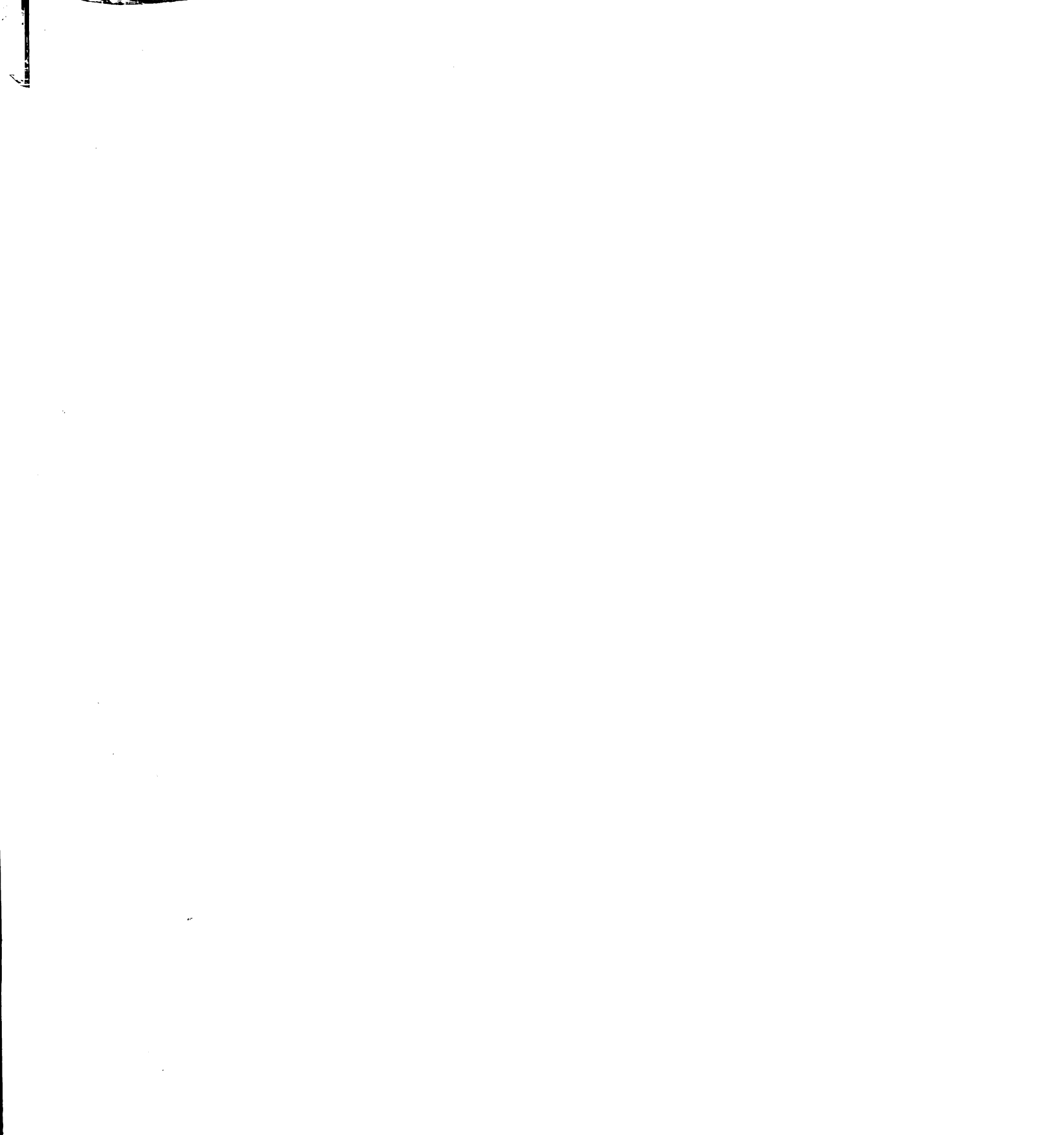


Table 74.2. Analysis of Variance for Belief-Disbelief in Communications x Office x Education

Source	Sum of Squares	df	Mean Square	F	p ^a
A	8.11	2	4.06	0.43	NS
B	578.00	1	578.00	60.84	< .01
C	1943.44	2	971.72	102.29	< .01
AxB	211.00	2	105.50	11.11	< .05
AxC	82.23	4	20.56	2.16	NS
BxC	589.00	2	294.50	31.00	< .01
<u>AxBxC</u>	<u>38.00</u>	<u>4</u>	9.50		
Total	3449.78	17			

Table 75.1. Multiple Contingency Table for Belief-Disbelief in Communications x Occupational Level x Expected Involvement

Occupational Level(B)	Expected Involvement(C)	Belief-Disbelief(A)		
		(1-11)	(12-15)	(16-26)
Supervisory	<u>(1-4)</u>	1	1	6
	<u>(5-6)</u>	4	14	17
	<u>(9)</u>	2	1	0
Non-supervisory	<u>(1-4)</u>	17	19	15
	<u>(5-6)</u>	33	28	40
	<u>(9)</u>	22	9	4

Table 75.2. Analysis of Variance for Belief-Disbelief in Communications x Occupational Level x Expected Involvement

Source	Sum of Squares	df	Mean Square	F	p ^a
A	8.77	2	4.38	0.26	NS
B	1104.50	1	1104.50	66.62	<.01
C	887.44	2	443.72	26.76	<.01
AxB	82.33	2	41.16	2.48	NS
AxC	207.23	4	51.81	3.12	NS
ExC	100.33	2	50.16	3.02	NS
AxBxC	66.34	4	16.58		
Total	2456.94	17			

^aBartlett's test: $\chi^2 = 1.36$, $df = 3$ for interactions, $p = NS$, H_0 accepted.

^bSame results obtained when pooled interactions were used as the error term.

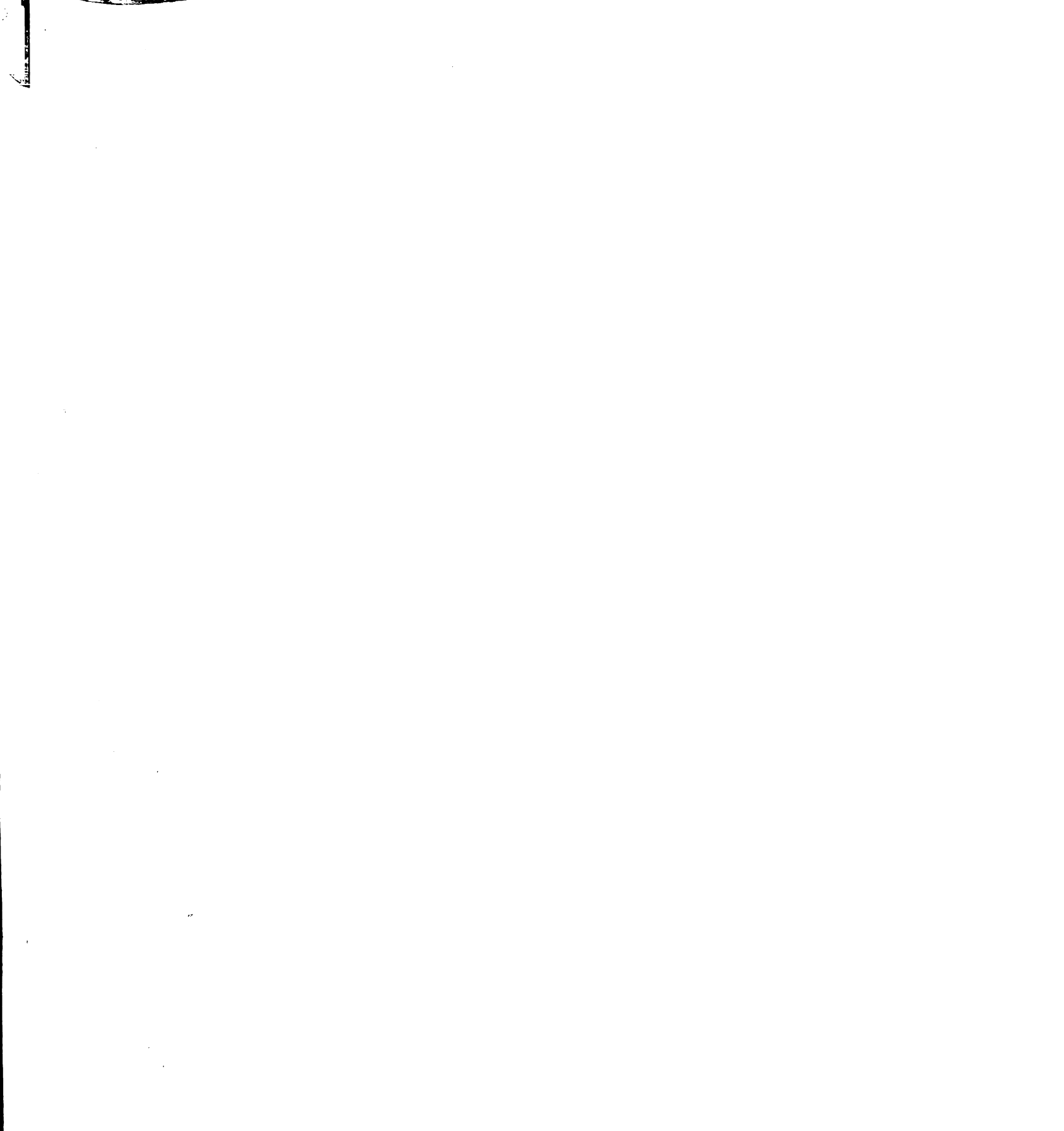


Table 76.1. Multiple Contingency Table for Belief-Disbelief in Communications x Realization of Expectations x Communicative Contacts

Realization of Expectations(B) ^a	Communicative Contacts(C)	Belief-Disbelief(A)		
		(1-11)	(12-15)	(16-26)
(0-13)	(1-3)	4	3	3
	(4-6)	7	5	4
(14)	(1-3)	7	3	3
	(4-6)	8	10	12
(15-25)	(1-3)	12	6	8
	(4-6)	9	19	25
(26-44)	(1-3)	18	3	4
	(4-6)	12	22	20

^aA score based on deviations between responses to pretest items II56-70 and to posttest items II48-61. High score = failure of expected changes in job to materialize; low score = expected changes in job took place.

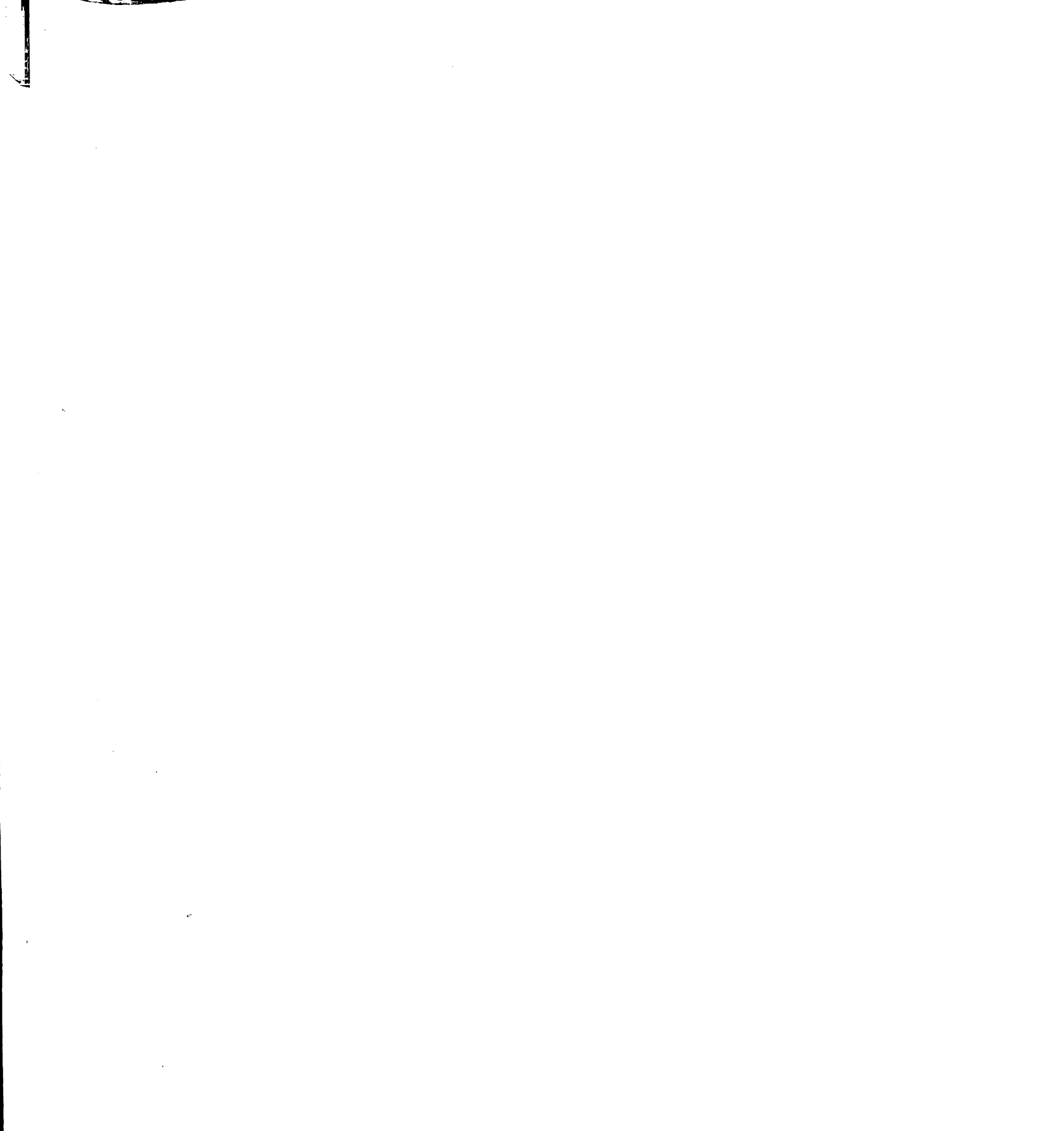


Table 76.2. Analysis of Variance for Belief-Disbelief in Communications x Realization of Expectations x Communicative Contacts

Source	Sum of Squares	df	Mean Square	F	p ^a
A	4.32	2	2.16	0.10	NS
B	354.14	3	118.05	5.35	<.05
C	260.04	1	260.04	11.79	<.05
AxB	49.00	6	8.17	0.37	NS
AxC	184.35	2	92.18	4.18	NS
BxC	55.75	3	18.58	0.84	NS
AxBxC	132.35	6	22.06		
Total	1039.95	23			

^aResults differed when pooled interactions were used for error term, see Table 76.3 below.

Table 76.3. Analysis of Variance for Belief-Disbelief in Communications x Realization of Expectations x Communicative Contacts using pooled Interactions as the Error Term

Source of Variation	Sum of Squares	df	Mean Square	F	p ^a
AxB	49.00	6	8.17	0.24	NS
Pooled Interaction	372.45	11	33.86		
AxC	184.35	2	92.18	5.83	<.05
Pooled Interaction	237.10	15	15.81		
BxC	55.75	3	18.58	0.71	NS
Pooled Interaction	365.70	14	26.12		

^aBartlett's test: $\chi^2 = 5.59$, $df = 3$ for interactions, $p = NS$, H_0 accepted.

2. Change in Readiness for Change

The subgroupings on the variable measure for use in the multiple contingency tables were:

<u>Group</u>	<u>Score range</u>	<u>Interpretation</u>
I	-3 to -19	Become less ready for change
II	±2	Essentially no change
III	+3 to +15	Become more ready for change

Table 77.1. Multiple Contingency Table for Change in Readiness for Change x Tenure x Age

Tenure(B)	Age(C)	Change in Readiness for Change(A)		
		(-3 to -19)	(±2)	(+3 to +15)
	<u>(1-2)</u>	33	28	14
(1-2)	<u>(3-4)</u>	3	5	2
	<u>(5-6)</u>	1	0	0
	<u>(1-2)</u>	21	11	14
(3-5)	<u>(3-4)</u>	9	9	7
	<u>(5-6)</u>	0	2	3
	<u>(1-2)</u>	9	8	10
(6-7)	<u>(3-4)</u>	15	13	13
	<u>(5-6)</u>	4	11	1

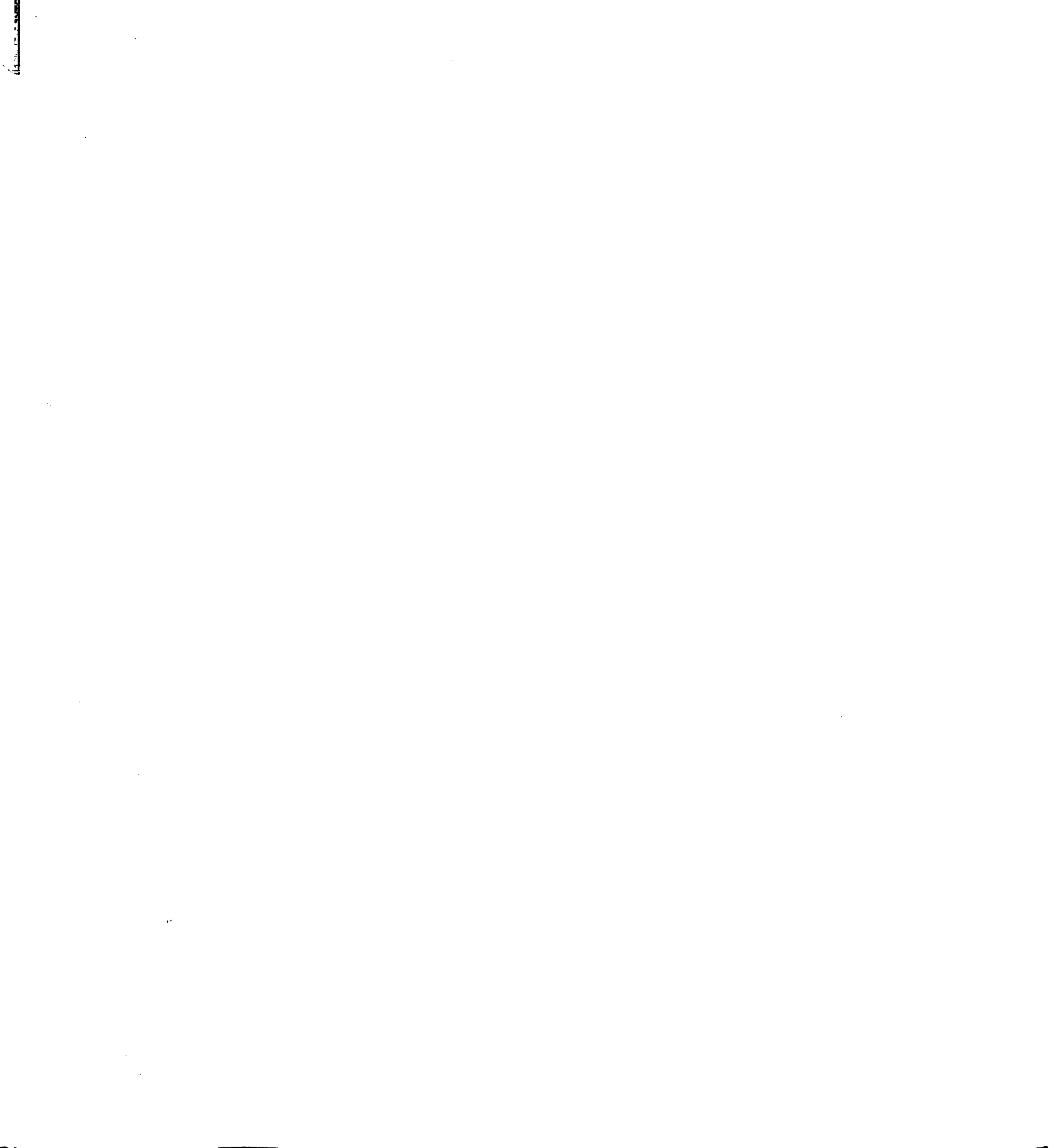


Table 77.2. Analysis of Variance for Change in Readiness for Change x Tenure x Age

Source	Sum of Squares	df	Mean Square	F	p ^a
A	57.56	2	28.78	1.64	NS
B	6.23	2	3.12	0.18	NS
C	888.00	2	222.00	25.28	<.01
AxB	47.55	4	11.89	0.68	NS
AxC	71.11	4	17.78	1.01	NS
BxC	583.77	4	145.94	8.31	<.05
<u>AxBxC</u>	<u>140.45</u>	<u>8</u>	17.56		
Total	1794.67	26			

^aBartlett's test = $\chi^2 = 56.55$, df = 3 for interactions, p = NS, H₀ rejected. Pooling of interactions not warranted because of lack of homogeneity of variance.

Table 78.1. Multiple Contingency Table for Change in Readiness for Change x Occupational Level x Office

Occupational Level (B)	Office(C)	Change in Readiness for Change (A)		
		(-3 to -19)	(±2)	(+3 to +15)
Supervisory	<u>Home</u>	12	13	10
	<u>Branch</u>	5	6	3
Non-Supervisory	<u>Home</u>	47	48	41
	<u>Branch</u>	31	20	10

Table 78.2. Analysis of Variance for Change in Readiness for Change x Occupational Level x Office

Source	Sum of Squares	df	Mean Square	F	p ^a
A	129.50	2	64.75	4.11	NS
B	1825.33	1	1825.33	115.89	<.01
C	768.00	1	768.00	48.76	<.05
AxB	66.17	2	33.08	2.10	NS
AxC	31.50	2	15.75	1.00	NS
BxC	243.00	1	243.00	15.43	NS
<u>AxBxC</u>	<u>31.50</u>	<u>2</u>	15.75		
Total	3095.00	11			

^aResults differed when pooled interactions were used for error term, see Table 78.3.

Table 78.3. Analysis of Variance for Change in Readiness for Change x Occupational Level x Office using pooled Interactions as the Error Term

Source of Variation	Sum of Squares	df	Mean Square	F	p ^a
AxB	66.17	2	33.08	0.54	NS
Pooled Interaction	306.00	5	61.20		
AxC	31.50	2	15.75	0.23	NS
Pooled Interaction	340.67	5	68.13		
BxC	243.00	1	243.00	11.29	<.05
Pooled Interaction	129.17	6	21.53		

^aBartlett's test: $\chi^2 = 4.28$, $df = 3$ for interactions, $p = NS$, H_0 accepted.

Table 79.1. Multiple Contingency Table for Change in Readiness for Change x Expected Involvement x Degree of Informed Awareness

Expected In- volvement(B)	Degree of In- formed Awareness(C)	Change in Readiness for Change(A)		
		(-3 to -19)	(±2)	(+3 to +15)
(1-4)	<u>(3-5)</u>	2	1	4
	<u>(6-8)</u>	13	11	6
	<u>(9-11)</u>	2	1	2
(5-6)	<u>(3-5)</u>	7	5	5
	<u>(6-8)</u>	3	5	4
	<u>(9-11)</u>	4	5	3
(9)	<u>(3-5)</u>	18	13	8
	<u>(6-8)</u>	25	29	19
	<u>(9-11)</u>	8	5	7

Table 79.2. Analysis of Variance for Change in Readiness for Change x Expected Involvement x Degree of Informed Awareness

Source	Sum of Squares	df	Mean Square	F	p ^a
A	33.85	2	16.92	2.61	NS
B	606.74	2	303.37	46.82	<.01
C	350.52	2	175.26	27.05	<.01
AxB	25.04	4	6.26	0.97	NS
AxC	32.59	4	8.15	1.26	NS
BxC	264.37	4	66.09	10.20	<.01
<u>AxBxC</u>	<u>51.85</u>	<u>8</u>	6.48		
Total	1364.96	26			

^aBartlett's test: $\chi^2 = 57.18$, $df = 3$ for interactions, $p = <.01$, H_0 rejected. Pooling of interactions not warranted because of lack of homogeneity of variance.

Table 80.1. Multiple Contingency Table for Change in Readiness for Change x Communicative Contacts x Education

Communicative Contacts (B)	Education	Change in Readiness for Change (A)		
		(-3 to -19)	(±2)	(+3 to +15)
(1-3)	<u>(1-5)</u>	20	7	3
	<u>(6)</u>	3	5	5
	<u>(7-9)</u>	0	3	1
(4-6)	<u>(1-5)</u>	29	26	6
	<u>(6)</u>	13	30	23
	<u>(7-9)</u>	6	20	34

Table 80.2. Analysis of Variance of Change in Readiness for Change x Communicative Contacts x Education

Source	Sum of Squares	df	Mean Square	F ^a	p ^b
A	42.33	2	21.16	0.46	NS
B	1088.89	1	1088.89	23.60	<.01
C	61.00	2	30.50	0.66	NS
AxB	121.45	2	60.72	1.32	NS
AxC	667.67	4	166.92	3.62	NS
BxC	62.11	2	31.06	0.67	NS
<u>AxBxC</u>	<u>184.55</u>	<u>4</u>	46.14		
Total	2228.00	17			

^aBartlett's test: $\chi^2 = 2.61$, $df = 3$ for interactions, $p = NS$, H_0 accepted.

^bSame results obtained when pooled interactions were used as the error term.

3. Affective Response to the Computer

The subgroupings on the variable measure for use in the multiple contingency tables were:

<u>Group</u>	<u>Score range</u>	<u>Interpretation</u>
I	3-7	Positive response to computer
II	8-13	Negative response to computer

Table 81.1. Multiple Contingency Table for Affective Response to the Computer x Tenure x Age

Tenure(B)	Age(C)	Affective Response to the Computer (A)	
		(3-7)	(8-13)
	<u>(1-2)</u>	34	30
(1-2)	<u>(3-4)</u>	7	2
	<u>(5-6)</u>	0	0
	<u>(1-2)</u>	23	19
(3-5)	<u>(3-4)</u>	12	11
	<u>(5-6)</u>	0	4
	<u>(1-2)</u>	9	16
(6-7)	<u>(3-4)</u>	26	11
	<u>(5-6)</u>	6	7

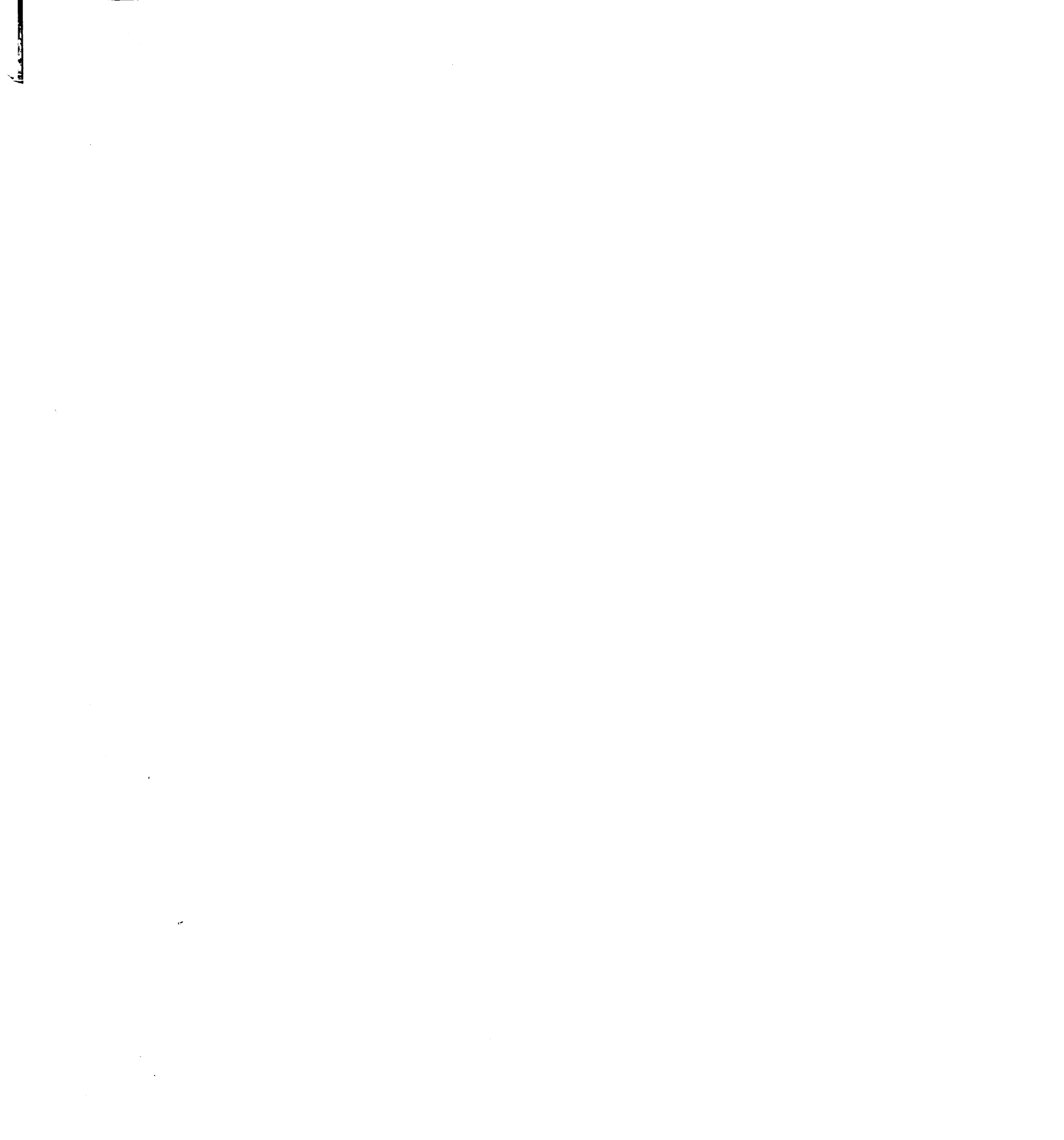


Table 81.2. Analysis of Variance for Affective Response to the Computer x Tenure x Age

Source	Sum of Squares	df	Mean Square	F	p ^a
A	16.06	1	16.06	0.71	NS
B	3.10	2	1.55	0.77	NS
C	1085.77	2	542.88	23.89	<.01
AxB	5.78	2	2.89	0.13	NS
AxC	61.78	2	30.89	1.36	NS
BxC	619.57	4	154.89	6.82	<.05
AxBxC	90.88	4	22.72		
Total	1882.94	17			

^aBartlett's test: $\chi^2 = 8.41$, $df = 3$ for interactions, $p = <.02$, H_0 rejected. Pooling of interactions not warranted because of lack of homogeneity of variance.

Table 82.1. Multiple Contingency Table for Affective Response to the Computer x Occupational Level x Office

Occupational Level(B)	Office(C)	Affective Response to the Computer(A)	
		(3-7)	(8-13)
<u>Supervisory</u>	<u>Home</u>	22	12
	<u>Branch</u>	9	1
<u>Non-supervisory</u>	<u>Home</u>	65	59
	<u>Branch</u>	21	28

Table 82.2. Analysis of Variance for Affective Response to the Computer x Occupational Level x Office

Source	Sum of Squares	df	Mean Square	F	p ^a
A	36.12	1	36.12	0.76	NS
B	2112.50	1	2112.50	44.49	NS
C	1225.12	1	1225.12	25.80	NS
AxB	12.76	1	12.76	0.27	NS
AxC	28.14	1	28.14	0.59	NS
BxC	292.76	1	292.76	6.16	NS
AxBxC	47.48	1	47.48		
Total	3754.88	7			

^aBartlett's test: $\chi^2 = 2.80$, $df = 3$ for interactions, $p = NS$, H_0 accepted. Pooled interactions gave same results for interaction effects; main effects "B" and "C" were found significant at .01 and .05 level, respectively.

Table 83.1. Multiple Contingency Table for Affective Response to the Computer x Education x Communicative Contacts

Education(B)	Affective Response to the Computer(C)	Communicative Contacts (A)	
		(1-3)	(4-6)
(1-5)	(3-7)	11	48
	(8-13)	5	19
(6)	(3-7)	13	27
	(8-13)	9	26
(7-9)	(3-7)	11	6
	(8-13)	22	18

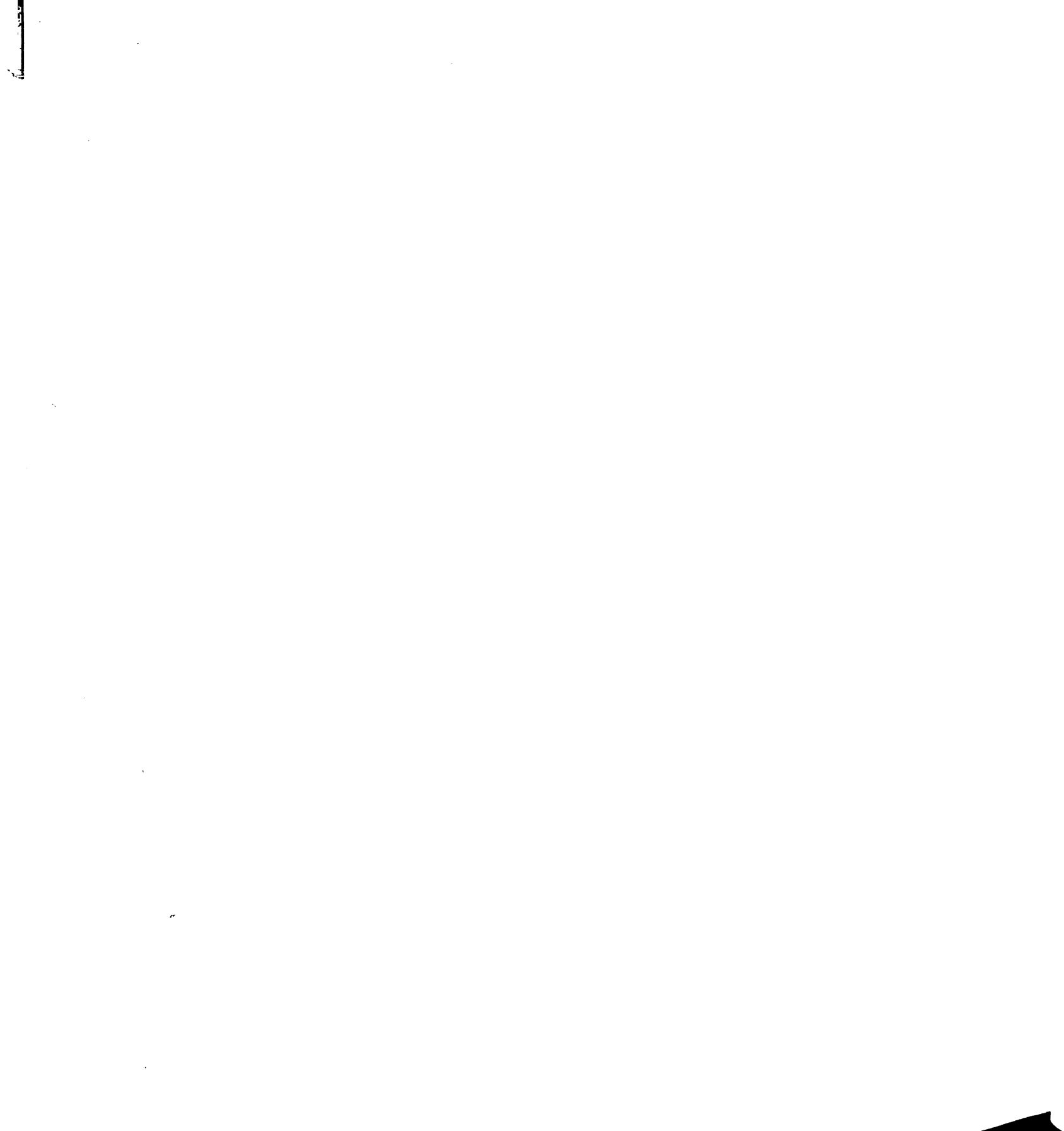


Table 83.2. Analysis of Variance for Affective Response to the Computer x Education x Communicative Contacts

Source	Sum of Squares	df	Mean Square	F ^a	p ^b
A	444.08	1	444.08	8.49	NS
B	88.67	2	44.34	0.85	NS
C	24.08	1	24.08	0.46	NS
AxB	466.67	2	233.34	4.46	NS
AxC	30.09	1	30.09	0.58	NS
BxC	420.67	2	210.34	4.02	NS
<u>AxBxC</u>	<u>104.66</u>	<u>2</u>	<u>52.33</u>		
Total	1578.92	11			

^a Bartlett's test: $\chi^2 = 1.97$, $df = 3$ for interactions, $p = NS$, H_0 accepted.

^b Same results obtained when pooled interactions were used as the error term.

Table 84.1. Multiple Contingency Table for Affective Response to the Computer x Expected Involvement x Degree of Informed Awareness

Expected Involvement(B)	Degree of Informed Awareness(C)	Affective Response to the Computer(A)	
		(3-7)	(8-13)
(1-4)	<u>(3-5)</u>	9	4
	<u>(6-8)</u>	25	9
	<u>(9-11)</u>	6	2
(5-6)	<u>(3-5)</u>	17	13
	<u>(6-8)</u>	36	26
	<u>(9-11)</u>	15	10
(9)	<u>(3-5)</u>	0	11
	<u>(6-8)</u>	3	9
	<u>(9-11)</u>	0	2

Table 84.2. Analysis of Variance for Affective Response to the Computer x Expected Involvement x Degree of Informed Awareness

Source	Sum of Squares	df	Mean Square	F	p ^a
A	34.72	1	34.72	9.78	<.05
B	733.77	2	366.88	103.35	<.01
C	478.10	2	239.05	67.34	<.01
AxB	189.78	2	94.89	26.73	<.01
AxC	40.79	2	20.40	5.75	NS
BxC	145.57	4	36.39	10.25	<.05
AxBxC	14.21	4	3.55		
Total	1636.94	17			

^aBartlett's test: $\chi^2 = 7.19$, $df = 3$ for interactions, $p = <.05$, H_0 rejected. Pooling of interactions not warranted because of lack of homogeneity of variance.

APPENDIX C

APPENDIX C

Multiple Analyses of Covariance

The degrees of freedom involved in these analyses of covariance were as follows:

<u>Source</u>	<u>df</u>	<u>Remarks</u>
total	$N-1$	N = total number of cases
between	$n-1$	n = number of treatments
within	$N-n$	

adjusted sums of squares

Total	$N-1-r$	r = number of variables for which adjustments were made; one df lost for each regression coefficient calculated.
Between	$n-1$	
Within	$N-n-r$	

The F values were obtained by dividing the adjusted mean square between groups by the within adjusted mean square for the errors of estimate.

Hypothesis ITable 85.1. Variable Data¹ used in Preparation of Multiple Analysis of Covariance for Hypothesis I

Treatment	X ₁	X ₂	X ₃	X ₄	Y	N
1	254	1440	197	91	949	52
2	306	1827	262	117	1193	64
3	309	1776	275	107	1223	63
	869	5043	734	315	3365	179

¹ X₁=Involvement, X₂=Initial RFC, X₃=Contacts, X₄=Level, Y=RFC deviations.

Table 85.2. Sums of Squares and Cross Products used in Preparation of Multiple Analysis of Covariance

Sums of Squares	Sums of Cross Products
X ₁ = 4483	X ₁ X ₂ = 24347
X ₂ = 149531	X ₁ X ₃ = 3540
X ₃ = 3118	X ₁ X ₄ = 1521
X ₄ = 587	X ₂ X ₃ = 20887
Y = 69157	X ₂ X ₄ = 8770
	X ₃ X ₄ = 1260
	X ₁ Y = 16531
	X ₂ Y = 91322
	X ₃ Y = 13802
	X ₄ Y = 5919

Source

Total

Between

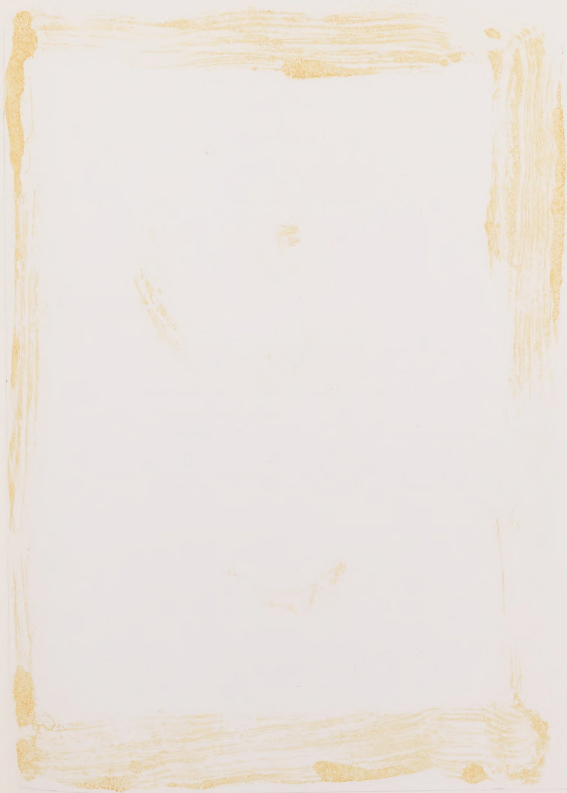
Within

Table 85.3. Multiple Analysis of Covariance for Hypothesis I

Source	df	SS _{x₁}	SS _{x₂}	SS _{x₃}	SS _{x₁}	X ₁ X ₂	X ₁ X ₃	X ₁ X ₄	X ₂ X ₃	X ₂ X ₄	X ₃ X ₄	SS _y	X ₁ Y	X ₂ Y	X ₃ Y	X ₄ Y
Total	178	264.22	7453.63	108.19	32.67	135.50	23.38	8.24	207.88	104.55	31.67	5898.76	194.77	3480.76	3.62	2.64
Between	2	0.55	20.98	9.48	0.54	2.45	0.38	0.53	7.93	1.81	0.89	41.01	1.83	10.61	19.20	2.79
Within	176	263.67	7432.65	98.71	32.13	133.05	23.00	7.71	199.95	102.74	30.78	5857.75	192.94	3470.15	-15.58	-0.15

Table 85.4. F Test for Analysis of Covariance

Source of Variation	Adjusted sum of squares of estimate	df	Mean Square	F	p
Total	4083.60	174			
Within	4042.38	172	23.50		
Between	41.22	2	20.61	0.88	NS



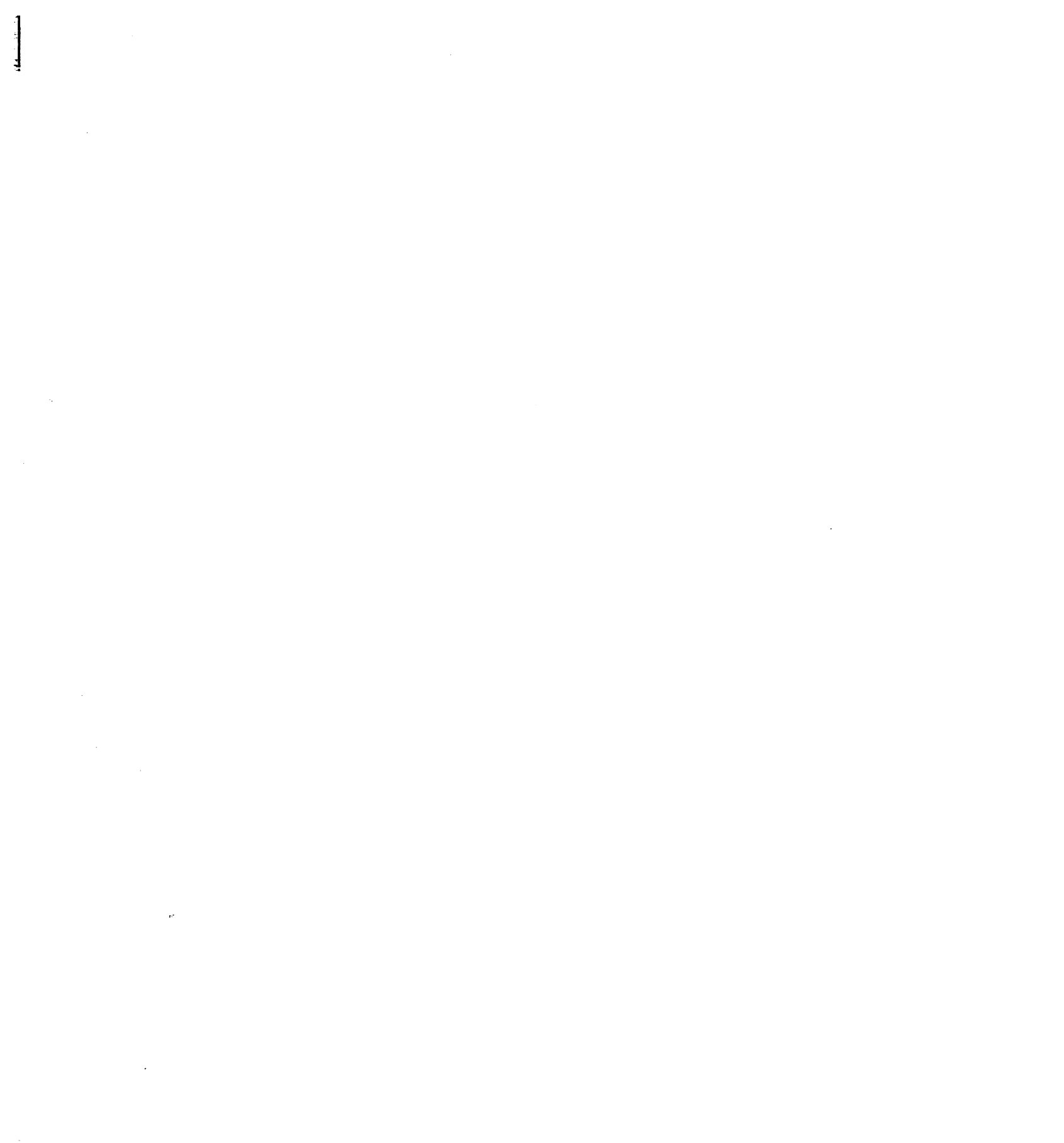


Table 85.5. Supplementary Data for Analysis of Covariance

Test for Homogeneity of Variance ^a	Regression Weights		Treatment Means	
	b	b'	Obtained	Adjusted
$X^2 = 1.20$	$b_1 = +.57$	$+.58$	18.25	18.26
df = 2	$b_2 = +.49$	$+.49$	18.64	18.57
p = NS	$b_3 = -.62$	$-.78$	19.41	19.47
H_0 accepted	$b_4 = -1.09$	$-.88$		

^aSee Appendix D for formula used to test for homogeneity of variance.

Hypothesis II

Table 86.1. Variable Data¹ used in preparation of Multiple Analysis of Covariance for Hypothesis II

Treatment	ΣX_1	ΣX_2	ΣX_3	ΣY	N
1	249	193	90	362	51
2	297	260	115	419	63
3	287	259	100	397	59
Σ	833	712	305	1178	173

¹ X_1 =Involvement, X_2 =Contacts, X_3 =Level, Y=Response to Computer.

Table 86.2. Sums of Squares and Cross Products used in Preparation of Multiple Analysis of Covariance

Sums of Squares	Sums of Cross Products
$X_1 = 4267$	$X_1X_2 = 3407$
$X_2 = 3038$	$X_1X_3 = 1457$
$X_3 = 569$	$X_2X_3 = 1224$
$Y = 8708$	$X_1Y = 5781$
	$X_2Y = 4776$
	$X_3Y = 2102$

Table 86.3. Multiple Analysis of Covariance for Hypothesis II

Source	df	SS _{x₁}	SS _{x₂}	SS _{x₃}	X ₁ X ₂	X ₁ X ₃	X ₂ X ₃	SS _y	X ₁ Y	X ₂ Y	X ₃ Y
Total	172	256.08	107.69	31.28	-21.30	-11.58	-31.26	686.71	107.99	-72.18	25.18
Between	2	1.02	10.04	0.52	-0.41	-0.59	-1.09	6.22	1.76	-6.29	-0.27
Within	170	255.06	97.65	30.76	-20.89	-10.99	-30.17	680.49	107.13	-65.89	25.45

Table 86.4. F Test for Analysis of Covariance

Source of Variation	Adjusted Sum of Squares of Estimate	df	Mean Square	F	p
Total	597.09	169			
Within	594.88	167	3.56		
Between	2.21	2	1.12	0.31	MS

Table 86.5. Supplementary Data for Analysis of Covariance

Test for Homogeneity of Variance	Regression Weights		Treatment Means	
	b	b'	obtained	adjusted
$X^2 = 1.89$	$b_1 = +.41$	$+.41$	7.10	6.93
df = 2	$b_2 = -.41$	$-.44$	6.65	6.66
p = NS	$b_3 = +.57$	$+.52$	6.73	6.86
H ₀ accepted				

Hypothesis IIITable 87.1. Variable Data¹ used in Preparation of Multiple Analysis of Covariance for Hypothesis III

Treatment	ΣX_1	ΣX_2	ΣX_3	ΣY	N
1	2036	275	113	1417	77
2	2063	306	88	1488	75
3	2240	336	94	1488	79
Σ	6339	917	295	4393	231

¹X₁ = Initial RFC, X₂ = Office, X₃ = Contacts, Y = RFC deviations.



Table 87.2. Sums of Squares and Cross Products used in preparation of Multiple Analysis of Covariance

Sums of Squares	Sums of Cross Products
$X_1 = 183497$	$X_1X_2 = 25444$
$X_2 = 3860$	$X_1X_3 = 8115$
$X_3 = 423$	$X_2X_3 = 1122$
$Y = 90731$	$X_1Y = 116318$
	$X_2Y = 17439$
	$X_3Y = 5523$

Table 87.3. Multiple Analysis of Covariance for Hypothesis III

Source	df	SSX ₁	SSX ₂	SSX ₃	X ₁ X ₂	X ₁ X ₃	X ₂ X ₃	SS _y	X ₁ Y	X ₂ Y	X ₃ Y
Total	230	9544.97	219.79	46.27	280.09	19.74	-49.06	7187.94	-4232.76	0.12	-87.11
Between	2	143.16	19.47	4.20	51.65	-21.46	-8.65	82.48	38.24	21.58	-14.16
Within	228	9401.81	200.31	42.07	228.44	-41.20	-40.41	7105.46	-4271.00	-21.46	-72.95

Table 87.4. F Test for Analysis of Covariance

Source of Variation	Adjusted Squares of Estimate ^a	df	Mean Square ^b	F	p
Total	5168.16	227			
Within	4964.41	225	22.06		
Between	203.75	2	101.88	4.62	<.05

^aAdjusted sum of squares of errors of estimate for Y, see Appendix D.

^bAdjusted mean square for Y.

Table 87.5. Supplementary Data for Analysis of Covariance

Test for Homogeneity of Variance	Regression Weights		Treatment Means	
	b	b'	Obtained	Adjusted ^a
$\chi^2 = 1.22$	b = -.46,	-.45	18.40	18.35
df = 2	b = -.02,	+.25	19.84	19.64
p = NS	b = -2.21,	-1.42	18.84	19.07

H₀ accepted

^aSee formula in Appendix D.

Hypothesis IV

Table 88.1. Variable Data used in preparation of Multiple Analysis of Covariance for Hypothesis IV

Treatment	ΣX_1	ΣX_2	ΣX_3	ΣY	N
1	249	198	73	387	53
2	284	246	68	408	59
3	341	299	83	461	70
Σ	874	743	224	1256	182

¹ x_1 = Involvement, x_2 = Contacts, x_3 = Office,
Y = Response to Computer.

Table 88.2. Sums of Squares and Cross products used in preparation of Multiple Analysis of Covariance

Sums of Squares	Sums of Cross Products
$X_1 = 4464$	$X_1X_2 = 3549$
$X_2 = 3147$	$X_1X_3 = 1078$
$X_3 = 308$	$X_2X_3 = 878$
$X = 9378$	$X_1Y = 6144$
	$X_2Y = 5046$
	$X_3Y = 1541$

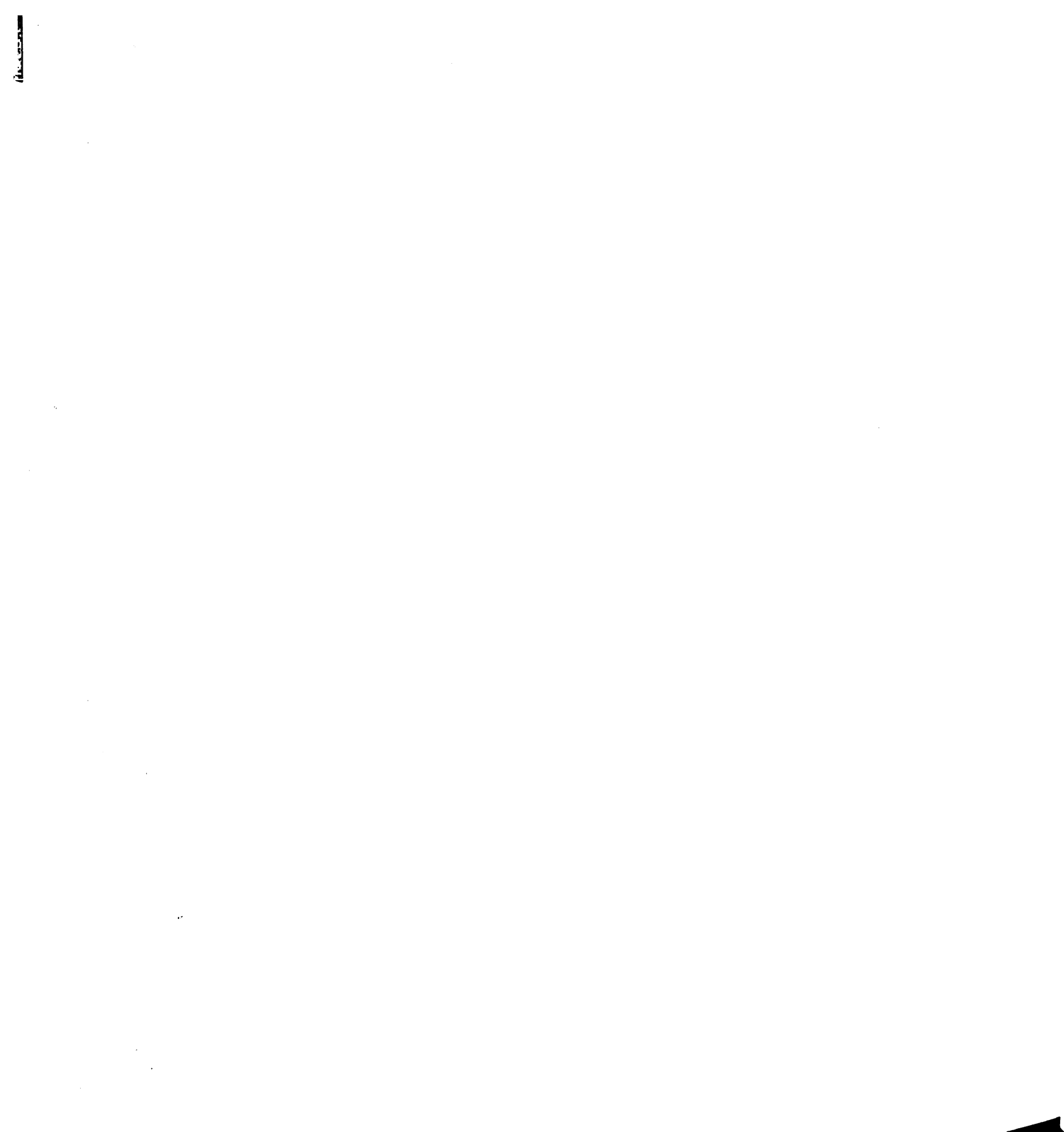


Table 88.3. Multiple Analysis of Covariance for Hypothesis IV

Source	df	SS _{x1}	SS _{x2}	SS _{x3}	X ₁ X ₂	X ₁ X ₃	X ₂ X ₃	SS _y	X ₁ Y	X ₂ Y	X ₃ Y
Total	181	266.88	113.76	32.31	-19.03	2.31	-36.46	710.22	112.44	-81.52	-4.85
Between	2	0.92	9.31	1.64	2.89	-1.08	-3.69	15.49	-3.73	-11.46	4.04
Within	179	265.96	104.45	40.67	-21.92	3.39	-32.77	694.73	116.17	-70.06	-8.89

Table 88.4. F Test for Analysis of Covariance

Source of Variation	Adjusted Sum of Squares of Estimate	df	Mean Square	F	p
Total	572.33	178			
Within	565.53	176	3.21		
Between	6.80	2	3.40	1.06	NS

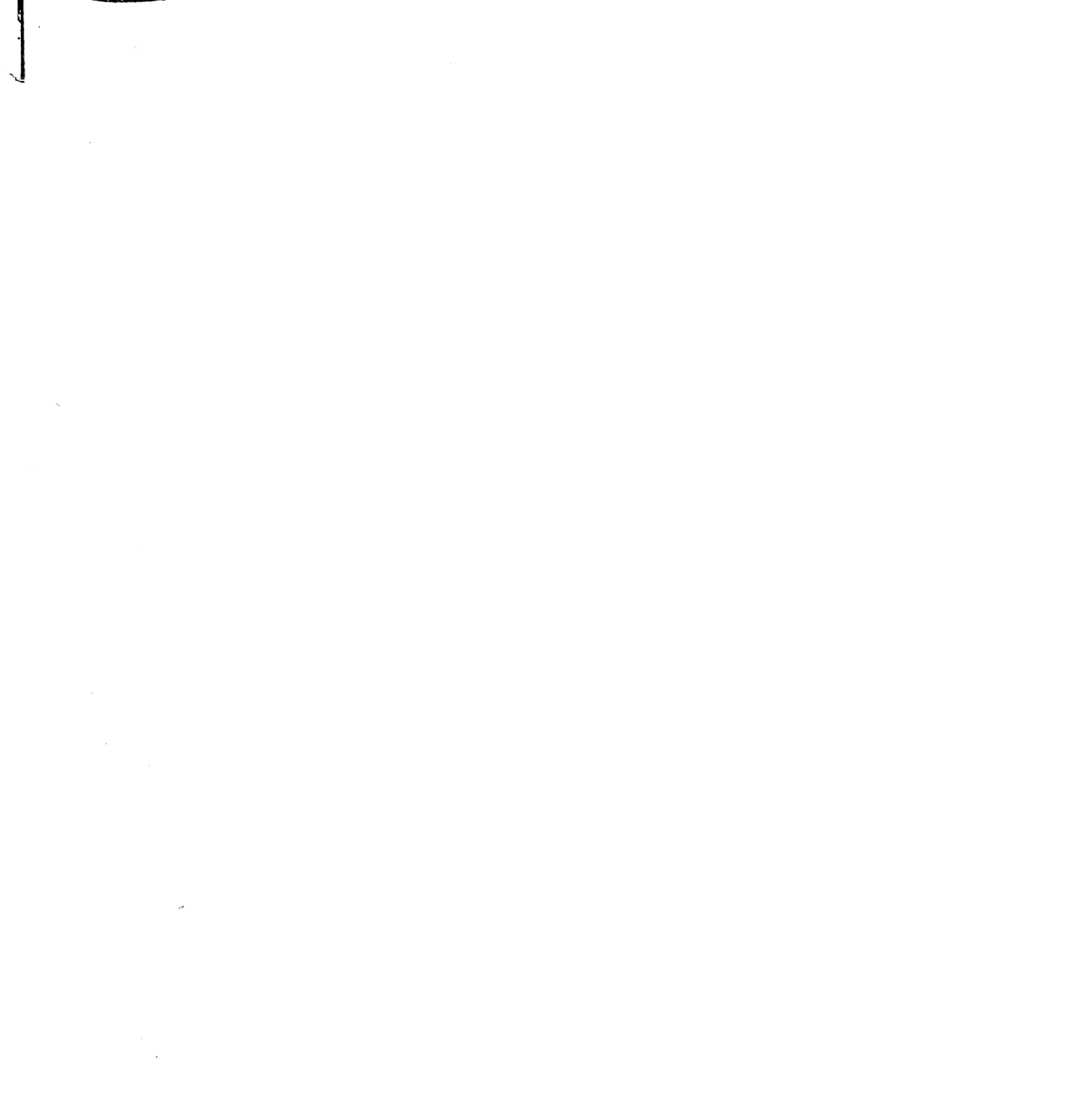


Table 88.5. Supplementary Data for Analysis of Covariance

Test for Homogeneity of Variance	Regression Weights		Treatment Means	
	b	b'	obtained	adjusted
$\chi^2 = 1.71$	$b_1 = +.37$	$+.35$	7.30	7.19
df = 2	$b_2 = -1.05$	-1.12	6.92	6.89
p = NS	$b_3 = -1.45$	-1.44	6.59	6.69
H_0 accepted				

APPENDIX D

APPENDIX D

Statistical Formulae

1. Intraclass Correlation (Guilford, 1954, p. 395).

$$r_{kk} = \frac{V_p - V_e}{V_p}$$

where: r_{kk} = intraclass correlation for mean ratings from k raters
 V_p = variance for items
 V_e = variance for error

2. Skewness Index (Garrett, 1937, p. 115).

$$S_k = \frac{3(M_n - M_{dn})}{SD}$$

where: M_n = mean score
 M_{dn} = median score
 SD = standard deviation of distribution

3. t Test of Significance (Edwards, 1946, p. 182).

$$t = \frac{M_1 - M_2}{\sigma_{m_d}}$$

where: M = Mean score for Upper 27% group
 M = Mean Score for Lower 27% group
 σ_{m_d} = standard error of the mean difference for independent groups

4. Cosine-pi Approximation for Estimating Tetrachoric r (Guilford, 1950, p. 336).

$$r_t = \cos \left(\frac{180^\circ \sqrt{bc}}{\sqrt{ad} + \sqrt{bc}} \right)$$

where: a, b, c, and d = cell frequencies in a 2 x 2 table.
 \cos = cosine

5. Split-Half Reliability Corrected for Unequal Parts (Guilford, 1950, p. 336)

$$R = r \frac{[\sqrt{r^2 + 4pq(1-r)} - r]}{2pq(1-r^2)}$$

where: R = reliability
 r = correlation between the two parts
 p = proportion of total test devoted to one part
 q = 1-p

6. Spearman-Brown Prophecy Formula (Guilford, 1950, p. 492).

$$r_{tt} = \frac{2r_{hh}}{1 + r_{hh}}$$

where: r_{tt} = reliability of a total test estimated from reliability of one of its halves
 r_{hh} = self-correlation of a half-test

7. Pearson Product-Moment Coefficient of Correlation Calculated from Original Data (Guilford, 1950 p. 195).

$$r_{xy} = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{[N\sum X^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2]}}$$

where: N = number of cases
 X = original measurements on X
 Y = original measurements on Y

8. r_{tt} Estimated from Average Item Intercorrelation (Guilford, 1950, p. 494).

$$r_{tt} = \frac{n\bar{r}_{ij}}{1 + (n-1)\bar{r}_{ij}}$$

where: n = number of items
 \bar{r}_{ij} = average item intercorrelation

9. Rulon Formula (Guilford, 1954, p. 379).

$$r_{tt} = 1 - \frac{\sigma_d^2}{\sigma_t^2}$$

where: r_{tt} = reliability
 d = differences between two half scores
 σ_d = SD of those differences
 σ_t = SD of the total score

10. Chi Square (Guilford, 1950, p. 276).

$$x^2 = \sum \left[\frac{(f_o - f_e)^2}{f_e} \right]$$

where: f_o = observed cell frequency
 f_e = expected cell frequency
 $(f_o - f_e)^2 / f_e$ = cell square contingency

11. Standard Error of Measurement (Guilford, 1950, p. 479).

$$\sigma_{t\infty} = \sigma_t \sqrt{1 - r_{tt}}$$

where: $\sigma_{t\infty}$ = standard error of measurement
 σ_t = standard deviation of obtained measure
 r_{tt} = reliability coefficient for obtained measure

12. Standard Error of a Mean Difference for Matched Pairs

Edwards, 1946, p. 174).

$$\sigma_{m_d} = \frac{\sigma_d}{\sqrt{N-1}}$$

where: σ_{m_d} = S.E. of mean difference
 σ_d = SD of distribution of differences between pairs
 N = number of pairs

13. Reliability of Difference Score (Guilford, 1954, p. 394).

$$r_{dd} = \frac{r_{jj} + r_{kk} - 2r_{jk}}{2(1 - r_{jk})}$$

where: r_{dd} = reliability of difference scores
 r_{jj} = reliability of X_j
 r_{kk} = reliability of X_k
 r_{jk} = intercorrelation between X_j and X_k

14. Calculation of Regression Weights (b and b')Three variables.

$$SSX_1^2 b_1 + SP(X_1 X_2) b_2 + SP(X_1 X_3) b_3 = SP(X_1 Y)$$

$$SP(X_1 X_2) b_1 + SSX_2^2 b_2 + SP(X_2 X_3) b_3 = SP(X_2 Y)$$

$$SP(X_1 X_3) b_1 + SP(X_2 X_3) b_2 + SSX_3^2 b_3 = SP(X_3 Y)$$

Four variables

$$SSX_1^2 b_1 + SP(X_1 X_2) b_2 + SP(X_1 X_3) b_3 + SP(X_1 X_4) b_4 = SP(X_1 Y)$$

$$SP(X_1 X_2) b_1 + SSX_2^2 b_2 + SP(X_2 X_3) b_3 + SP(X_2 X_4) b_4 = SP(X_2 Y)$$

$$SP(X_1 X_3) b_1 + SP(X_2 X_3) b_2 + SSX_3^2 b_3 + SP(X_3 X_4) b_4 = SP(X_3 Y)$$

$$SP(X_1 X_4) b_1 + SP(X_2 X_4) b_2 + SP(X_3 X_4) b_3 + SSX_4^2 b_4 = SP(X_4 Y)$$

where: b_1, b_2, b_3, b_4 = regression weights for variables

$X_1, X_2, X_3,$ and X_4 .

SS = sum of squares for $X_1, X_2, X_3,$ and X_4 .

SP = sum of products for $X_1 X_2, X_1 X_3, X_1 X_4,$
 $X_2 X_3, X_2 X_4,$ and $X_3 X_4$.

b weights found by solving simultaneous equations

15. Determination of Adjusted Treatment Means.

$$\hat{Y} = \bar{Y} - b_1(\bar{T}_1 - \bar{X}_1) - b_2(\bar{T}_2 - \bar{X}_2) - b_n(\bar{T}_n - \bar{X}_n)$$

where: \hat{Y} = adjusted treatment mean

\bar{Y} = obtained treatment mean

b_1, b_2, b_n = regression weights for $X_1, X_2,$ and X_n

T_1, T_2, T_n = treatment means for $X_1, X_2,$ and X_n

X_1, X_2, X_n = total means for $X_1, X_2,$ and X_n

16. Calculation of Adjusted Sum of Squares for Y.

$$SSy^2 - b_1 SP(X_1Y) - b_2 SP(X_2Y) - b_3 SP(X_3Y) - b_n SP(X_nY) = \text{adj. } SSy^2$$

17. Correlation Ratio for Regression of Y on X (Guilford, 1950, p. 316).

where: η_{yx} = correlation ratio for Y on X

$$\eta_{yx} = \frac{y'}{y}$$

$\sigma_{y'}$ = SD of Y' values predicted from X

σ_y = SD of total distribution for Y

18. Chi-Square Test of Linearity (Guilford, 1950, p. 320).

$$x^2 = (N-k) \frac{\eta^2 - r^2}{1 - \eta^2} \quad \text{where: } N = \text{total number of cases}$$

k = number of columns (or rows)

r = Pearson r value

η = correlation ratio

19. Bartlett's Test for Homogeneity of Variance for Groups with Unequal n 's (Edwards, 1950, p. 198).

$$x^2 = 2.3026 \left[\sum (n-1) \right] \left[\log \frac{\sum \sum x^2}{\sum (n-1)} \right] - \sum (n-1) (\log s^2)$$

where: n = number in each subgroup

x = sum of squares within each group

s = variance for each group

\sum = summation for each group

\log = natural log

2.3026 = $\log_e 10$, a constant

APPENDIX E

"650" PROGRESS REPORT #1 -- BY: [REDACTED]

This is the first of a series of articles planned to keep you currently informed of our progress in connection with the installation of an electronic computer commonly known as an IBM "650". Subsequent articles will appear in issues of the [REDACTED] or, if deemed necessary, through the medium of a special bulletin.

The computer is presently in the course of construction at the IBM assembly plant and is scheduled for delivery to us during the month of December, 1957.

You probably know that [REDACTED] and [REDACTED] are now working in the capacity of programmers. The duties of a programmer consist of writing up a procedural manual for adapting the "650". The first two programs selected were of a statistical report nature and have been subjected to a preliminary run at a "650" test installation. At the present time, both programs are in the course of final revision and upon completion will again be subjected to a test run to assure perfection.

It is our hope that such as to the effect the electronic computer will have on your work, as well as the reason for converting to a system of this nature, is of vital importance to you. Therefore, we present the following:

1. The Operating Committee wishes to assure that the installation of an electronic computer will in no way jeopardize your employment with [REDACTED].
2. Because of today's competition for good insurable risks of all types, it is becoming an absolute necessity that management receive accounting, financial, and statistical reports on the most current basis possible. [REDACTED] electrical accounting equipment will not permit us to consider the required data as promptly as we need it and, therefore, the conversion to an electronic computer operation was deemed a necessity. [REDACTED] is to increase the rate of continued progress in expansion in spite of increased competition.

Many numerous questions will arise in your minds as respects the conversion of the "650" and its subsequent adaptation to our operations. [REDACTED] will answer any questions you may have. We are by no means certain that we will answer all the questions, but because we will have access to IBM's [REDACTED] on the subject, we feel that answers can be obtained for you. If you [REDACTED] enough to refer your questions to [REDACTED] our Personnel [REDACTED] will attempt to have your questions answered either at a group [REDACTED] or on an individual basis.

We look forward to your wholehearted cooperation in assisting the [REDACTED] and those responsible for the successful installation and operation of the "650" electronic computer.

"650" PROGRESS REPORT #4 -- BY: [REDACTED]

Our "650" preparation schedule certainly gained momentum during this past month. Here are some of the highlights:

1. On October 2, 1957, [REDACTED] held a meeting with all personnel of the I. B. M. Key Punch and Tabulating Departments, the programmers, an I. B. M. representative and yours truly. The purpose of the meeting was two-fold:
 - (a) To familiarize those present with the mechanical operation of the "650".
 - (b) Specifically stress the extreme importance of the team work and cooperation required to successfully install and subsequently operate the computer.
2. On October 15, 1957, the programmers conducted a meeting which was attended by [REDACTED] and your reporter. The purpose of this meeting was to review the completed programs scheduled for "650" application, and the establishment of an educational program for personnel to be affected by the "650" operation. Supervisors and interested personnel will be notified when the programmers have compiled the data necessary to conduct the first educational session.
3. On October 16, 1957, Mr. [REDACTED] I. B. M.'s Physical Planning Engineer on Computer Installation, visited with us to determine our readiness for the installation by the scheduled delivery date. Pat offered a few worthwhile suggestions, for inclusion with our present plans, and left us with the feeling that we will be in complete readiness prior to the "650" delivery date.

MICHIGAN STATE IS INTERESTED IN US

You may have seen some of the following talks with [REDACTED] and [REDACTED] and their company may have wondered who they are.

The Labor and Industrial Relations Center at Michigan State University is making a series of studies of new office procedures and equipment. They want to find out how these things influence the people in the offices where they are installed.

The Center has asked [REDACTED] to let it come in and observe what happens when our IBM 650 computer comes in. The Company has agreed to cooperate and to let the Center make a study here. You will hear more about the study later.

"650" PROGRESS REPORT #2 -- BY: [REDACTED]

Our programmers, [REDACTED] conducted a "650" demonstration at the Detroit Data Processing Center on August 9th.

Attending the demonstration were Messrs. [REDACTED]

[REDACTED] In addition, IBM was represented by Messrs. [REDACTED]

Prior to the actual machine demonstration, [REDACTED] presented a resume of the progress made to date and also discussed some of the operations currently under study. [REDACTED] likewise described the "650" and its component units outlining the specific function performed by each. A comparative flow chart, reflecting steps currently required under our present system and those under a "650" method, was exhibited to further explain the operation to be demonstrated.

During the course of the demonstration, [REDACTED] operated the "650" and an explanation, as to how the instructions and tables comprising the program are recorded on the magnetic storage drum, was given. A test-deck was processed through the "650" for machine computation and the preparation of punched cards representing the results of the computations. The completed punched cards were subsequently processed through an IBM 407 Printer and the finished report was made available for scrutiny by the group in attendance.

The question and answer sessions indicated that there existed a genuine interest in the "650" and that everyone added to their previous knowledge of the computer.

"650" PROGRESS REPORT #3 -- BY: [REDACTED]

As you know, our programmers, [REDACTED] and [REDACTED], are busily engaged in preparing for the installation of the "650" scheduled for delivery during the month of December of this year. We have been both pleased and proud of the progress these fellows have been making and since the last "650" report we have been assured that our feelings were justified.

On September 17, 1957, Mr. [REDACTED] insurance expert of International Business Machines Corporation, visited with us for the purpose of evaluating the progress made to date. It was Mr. [REDACTED] considered opinion that the programmers were doing an outstanding job and that our preparatory schedule was at least equal to that of companies with two years of research prior to a "650" installation.

For the benefit of those who may not have read an article on automation which appeared in a recent issue of the Interpreter, we would like to quote the following:

*** That Automation Has Meant to the White Collar Workers:**

American Business magazine made a survey of 300 large and medium-sized corporations who had been quite active in office automation, and the results were that after automation equipment had been installed there were 2 per cent to 10 per cent more white collar employees than before. Also, in the past ten years, during the greatest period of office mechanization, clerical workers have tripled. The plain fact of the matter has taught us that automatized office systems help to keep companies competitive by speeding up office operations and providing for greater capacity, accuracy and versatility.

Unwinding of Personnel:

It is the natural consequence that office automation and the unwinding of office personnel go hand in hand, and this, of course, leads to a rise in the morale of White Collar workers. The fact that office workers relieved from routine, monotonous and menial jobs are in turn freed to do more skillful types of work and assume increased responsibility of a more interesting and varied nature.

"650" PROGRESS REPORT #5 - BY: [REDACTED]

This will probably be the last progress you will read (I hope) prior to the actual installation of the "650" electronic computer.

Since the last issue of the [REDACTED] the following activities have taken place:

1. On October 30, and 31, 1957, tests of "650" programs, at the Detroit I. B. M. Data Processing Test Center, were completed.
2. On November 11, 1957, "650" Information Sessions for all Home Office personnel, were conducted by the Programmers and the Personnel Department. The purpose of these sessions was to explain the reason for the acquisition of the "650" and included brief explanations of the computer's capabilities. Each session was concluded with a question and answer period which we hope proved beneficial to everyone.
3. On November 13, thru November 15, 1957, [REDACTED] attended the Fire and Casualty Electronic Data Processing Seminar, sponsored by I. B. M. at Poughkeepsie, New York. [REDACTED] advised us that the Seminar was attended by representatives of 36 insurance companies. In addition to the educational sessions, all representatives were escorted on a tour of the entire I. B. M. plant which is also located in Poughkeepsie.

Fig. 6. A series of progress reports on the installation of the IBM 650 appearing in the monthly house organ.

May 13, 1956

Bulletin # 1

To: All Home Office and Detroit Branch Office Personnel

Last November we told you that the Labor and Industrial Relations Center of Michigan State University was carrying on a broad program of research having to do with people working effectively together in industrial organizations. They requested then, and the Company gave permission, for this Labor and Industrial Relations Center to make a research study of the ideas and the opinions that our people may have had of their positions with the Company.

Dr. [redacted] who was in charge of this research study here, asked you to fill out a questionnaire as part of this series of studies, and both Doctor [redacted] and the Company are grateful for the help you gave them at that time. Dr. [redacted] tells us that they are finding the information very useful in their research.

Six months have elapsed since the questionnaire. For some of you this six months may have been one of job change or change in the general conditions of work in the office which may have affected you. For some of you, on the other hand, there may be little or no change.

It is important, Dr. [redacted] informs us, in their research to know whether the findings they obtained at one time will remain true at a later date. The Labor and Industrial Relations Center are, therefore, asking that you participate in the second study and that the employees who have joined the Company since the first survey and those employees who, for one reason or another, could not participate before take part in this one.

The second questionnaire study is scheduled as follows:

Home Office - May 28 - 1:30 P.M. and 3:30 P. M.
Place: Lunch Room

Detroit Branch - May 28 - 1:30 P.M.
Place: Your Desk

This second questionnaire is considerably shorter than the one you may have filled out in November. As in the first study, the answers that you give on this questionnaire will be made available only to the Research Department of the Labor and Industrial Relations Center of Michigan State University. No one connected in any way with the Company will see or use any of the individual questionnaires or be able to find out the nature of the answers that you have given. The information that you give, therefore, will be held in strictest confidence by the Center and the results from the study will be tabulated on a group basis only.

A report on the findings of this study and of the November 1957 study will be made to you by the end of 1958.

[redacted] President

12

To: All Home Office and Detroit Branch Office Personnel

The Labor and Industrial Relations Center of Michigan State University have been authorized by the Michigan Legislature to conduct a research program with the people employed in industrial organizations and in the larger offices of various types of companies.

They have requested, and we have given, permission for them to make a research study of the ideas and the opinions that our employees may have of their positions with the Company.

On Tuesday, November 19, 1957, you will be asked by the men from the Labor and Industrial Relations Center of the University, who are doing this study, to fill out a questionnaire. This questionnaire will be seen only by these research men. No one in the Company will see the questionnaire nor be told what any individual employee has answered. You may, therefore, feel absolutely free to fill out the questionnaire with complete sincerity and we would appreciate it if you would do so.

The Company would like to be of as much help and assistance as we can in this research, as the findings of these research men are intended to promote a better understanding of the problems of people employed in large offices.

Would you, therefore, freely express your individual views and opinions to these research men from the University.

[redacted] President

12-ml

P. S. Howell Office - 1:00 and 3:00 in the afternoon
Place - Lunch Room

Detroit Office - 1:15 P.M.
Place - Desk

Any further information can be given by your supervisor.

[redacted]

A. SUPERVISOR'S PH. 11-11-1957

From: [redacted] President
Bulletin # 2
Re: IBM 640 Electronic Computer

In our efforts to make our operations increasingly more efficient and in keeping pace with many of the larger companies in our industry, we have contracted to have the International Business Machines Company install in the Home Office an electronic computer known by the trade name of 640's. This computer has many features not possessed by the IBM machines we now use, but basically perhaps its principal feature is a "memory" drum. In this amazing electronic "memory" drum can be stored a tremendous amount of underwriting and premium classification data enabling the 640's to sort out various kinds of statistical information more rapidly than our present machines and to perform many functions which these present machines cannot do.

While the 640's is sometimes called an "electrical brain", it is not after all a brain at all. It is an order of things which it is told to do by human brains. It cannot make certain business decisions, but a very complex code wired into this "memory" drum. Designating out these coded directions to the job of the so-called "programmer". Because the programmer, in effect, write up a sort of procedural manual for making the 640's do [redacted] procedures, they are being assigned to the Methods and Procedures Section.

Mr. [redacted] our present Methods and Procedures Supervisor, and Mr. [redacted] of the Underwriting Department, have been designated as the programmers. It will be necessary that they take special IBM training, the first school starting April 22, 1957. In their work it will be necessary that they ask various supervisors for procedural information, and your wholehearted support in giving them any help you can in these preliminary steps toward making the computer do the work that we want it to do will be greatly appreciated.

This programming will take the full time of Mr. [redacted] and Mr. [redacted]. Mr. [redacted] will be assuming Mr. [redacted] methods and procedures duties immediately, and you are asked to address all methods and procedures correspondence or questions to Mr. [redacted].

Because it is felt that this new IBM computer will be an integral part of and very important to our sales and merchandising program, the overall preparation for its installation will be under the general supervision of Executive Vice President, Mr. [redacted]. Working very closely with him, in addition to the programmers, will be our Internal Auditor, Mr. [redacted].

Because of this and in cooperation with the entire program, Mr. [redacted] our Treasurer, is assuming the responsibility of Personnel and Office Services. This will involve no basic change in the accounting organization, and Mr. [redacted] will still direct the IBM operations through Miss [redacted] in the IBM Key Punch and Mr. [redacted] in the IBM Tabulating Departments.

MICHIGAN STATE UNIVERSITY

OF AGRICULTURE AND APPLIED SCIENCE - EAST LANSING

LABOR AND INDUSTRIAL RELATIONS CENTER

November 15, 1957

To: Employees of [redacted] Insurance Company

The Labor and Industrial Relations Center at Michigan State University is carrying on a broad program of research having to do with people working together effectively in industrial organizations. Much of the research consists of getting the ideas and opinions of people about their jobs.

You will be asked on November 19 to fill out a questionnaire as part of this series of studies. Your answers, along with those from people in other organizations, will be analyzed to help discover what things are most important in making the working situation better for the people in it.

The value of this study depends upon the sincerity and care with which you answer the questions. It is important to get your real feelings. We are looking for frank statements about your attitudes, feelings, opinions and judgments about certain aspects of your job.

The answers that you give will be made available only to the research team in the Labor and Industrial Relations Center. In no way reported in any way with your organization will see or use any of the individual questionnaires or be able to find out the nature of the answers that you have given. Your information will be held in the strictest confidence and the results of the study will be tabulated on a group basis only.

Reports on the general findings from the study will be prepared for you, the company and the general public.

[redacted]
Labor and Industrial Relations Center

Fig. 7. Bulletins issued by the company president and L.I.R.C. regarding the computer and plans for an attitude survey.

TO: [REDACTED] ASSURED 10/14/57
 POLICY NO. 650 Meeting DATE
 FROM: [REDACTED] YOUR FILE NO.
 SUBJECT: 650 Meeting
 AGENT

On October 2, 1957 a meeting was held for the personnel of IBM key punch and IBM tab sections. The purpose of this meeting was to familiarize these people with the 650 Electronic Computer.

[REDACTED] open the meeting with a few appropriate remarks which stressed the need for team work and the cooperation of everyone in the successful installation of the 650.

[REDACTED] IBM sales representative, then explained the mechanical operation of the 650. A blackboard was used on which diagrams were placed to show the internal operations of the 650.

I then explained the method of writing programs and a little about the operation codes contained in the programs. The need for accuracy in all phases of the work prior to its being placed on the 650 was stressed.

[REDACTED] made a few appropriate remarks to close the meeting during which he stressed the need for team work, cooperation, and accuracy on the part of all concerned in preparing the work for the 650.

Very few questions were presented. [REDACTED] because of the newness of this 650 to the people who attended the meeting. The primary purpose of the meeting was to create a team spirit and also to introduce them to the 650 computer.

To: [REDACTED] Date: 10-16-57
 From: [REDACTED] Subject: Minutes of Meeting

At eleven o'clock on October 15, 1957, a meeting was held in the Executive Dining Room to formulate our plans for the arrival of the IBM 650 electronic computer. The meeting was attended by [REDACTED] and myself.

The meeting was opened with a brief review of what has been accomplished by [REDACTED] and myself. This included the program for the rating of commercial vehicles and private passenger automobiles. The procedure manuals are in their initial stages and very shortly will be scrutinized and refined by the department managers and supervisors.

The first question to be handled by the group was just what business is to be processed on the 650 when it arrives in the middle of December. After some discussion, it was decided that all new applications to be written in the Home Office would be processed by use of the 650. In addition, renewal applications for the All Feature Policy which are to be converted to the Feature Plan Policy will also be processed by this system. All other renewals for private passenger automobiles and commercial vehicles will be processed by use of the present procedures now established. At this meeting it was estimated that there were about 300 new Home Office written applications per week and about 1000 renewal applications for All Feature policies which would be converted to the Feature Plan Policy. After this meeting, [REDACTED] and I reviewed the production figures for the past three months and found that the renewal applications which were written in the Home Office usually averaged 1500 and 2000 per week. Therefore, the volume of business which will be processed by the 650 at the start will probably be between 1500 and 2000 applications per week.

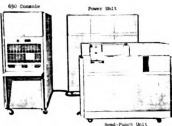
The next question which was discussed was the matter of personnel. After considerable discussion, it was unanimously felt that it was impossible for the managers and supervisors to determine their personnel requirements at this time. After the procedures have been established, probably within three or four weeks, it is probable that an answer can be forthcoming as to the personnel requirements of the various sections.

The last item to be discussed at the meeting concerns the education of the personnel in the departments and sections which will be most affected by the 650 operation. It was decided that meetings should be held with the people in these sections giving them a brief picture of the 650 and then successive meetings would be conducted by the supervisor of the section for the purpose of establishing the new procedures. The original meeting will last no longer than one hour and will be conducted by the programmers. The meetings on the system will be conducted by the supervisors or managers of the departments. Additional meetings of this group probably will be necessary to formulate a time schedule for the educational meetings and to enable the group to keep their finger on the development of our preparations for the 650.

Fig. 8. Minutes of meetings held in the home office dealing with preparations for the computer installation.

IBM INFORMATION SYSTEMS

November 11, 1971



These operations are being held to acquaint everyone with the IBM 650 Electronic Computer which will be installed in our new office about the middle of December. During the past few years the insurance market in [redacted] has been very competitive. This competition has forced the insurance companies to provide the best possible service to their agents and policyholders. With this thought in mind, Management decided upon an idea that the installation and use of a 650 Computer would enable us to maintain and improve our services and accuracy. The use of the 650 will:

- 1) Result in more efficient and faster preparation of reports and policy documents; and
- 2) Result in our receiving facilities to prepare computation and statistical reports as an accurate base line in new operations.

The IBM 650 Electronic Computer is composed of three units: the Power Unit, the Read-Punch Unit and the Control Unit. The Power Unit contains most wires and controls. This Unit supplies the power for all of the units which make up the 650 Computer.

The Read-Punch Unit contains the mechanism for the input and output of 650 data. Both the input and output is achieved by use of IBM cards. Information may be fed into the 650 as the rate of 100 cards per minute. Each card can contain up

IBM INFORMATION SYSTEMS

November 11, 1971

to 80 digits of information which means that the input can be as much as 10,000 digits per minute. 650 cards are used to transfer output from the 650. This card is similar to the cards you use in your calculator. Each card contains 80 digits of information. Therefore, output can be as high as 1000 digits of information per minute.

The 650 Computer contains the calculating unit and the memory drum. The calculating unit contains the 60 to 80 add, subtract, divide and multiply wires that do no calculations. This memory drum is actually the heart of the 650. The drum is a continuous, grooved cylinder about 17 inches diameter and 17' long. The drum is magnetized. Each digit which is stored on the drum is a patch of magnetic material which is so drilled by the 650. This magnetic drum provides room for the storage of 100,000 digits of information. Information is read on the drum by means only when other information is stored in the same location.

A basic input-output operation can also be performed by the 650. This operation requires that a card program of identifying information be placed on the drum. Management has decided to operate the 650 with a card program which will read and load information on the drum which will be used to identify information which will be read on the drum. This information will be used to identify information which will be read on the drum which will be used to identify information which will be read on the drum.

The 650 is essentially fast in performing any operation. A mathematical problem can be worked in less time than it takes a person to copy the figure.

But with all this speed, the 650 is not necessarily perfect to that it will not make an error. During the production cycle, you can check the card when read. The 650 has been operated in excess of 100,000 hours. There is yet to be an undetected mechanical error in the operation of any of these Computers.

Errors and mistakes will occur, though, if incorrect or incomplete information was fed into the 650. Sometimes the 650 will stop because of this information. This is not a serious fault and can be corrected by an error in the program. The most frequent fault even though the 650 is a mechanical machine, is the error of man. If it is an error of man, the 650 will stop because of this information. This is not a serious fault and can be corrected by an error in the program. The most frequent fault even though the 650 is a mechanical machine, is the error of man. If it is an error of man, the 650 will stop because of this information. This is not a serious fault and can be corrected by an error in the program.

During this visit with the contractors it was clear that contractors in the west side of the building prior to the installation of the top in December.

Report of information meeting - November 11, 1971

Object of formal installation

The computer is required to process reports, for computerized returns, and for rapid processing of reports. The computer is composed of three units: the power unit, the read and punch unit, and the computer drum. The speed of the 650 is very high and the output is excellent. The computer drum is magnetized. Each digit which is stored on the drum is a patch of magnetic material which is so drilled by the 650. This magnetic drum provides room for the storage of 100,000 digits of information. Information is read on the drum by means only when other information is stored in the same location. This is not a serious fault and can be corrected by an error in the program. The most frequent fault even though the 650 is a mechanical machine, is the error of man. If it is an error of man, the 650 will stop because of this information. This is not a serious fault and can be corrected by an error in the program.

The subject of the meeting was discussed. The subject will be to operate by installation in new space in the building prior to the installation of the top in December. The subject will be to operate by installation in new space in the building prior to the installation of the top in December. The subject will be to operate by installation in new space in the building prior to the installation of the top in December.

Questions asked by the group:

1. How fast can the 650 operate?
2. Will it be able to handle operations in the 650?
3. Will it be able to handle operations in the 650?
4. How fast can the 650 operate?
5. How fast can the 650 operate?
6. How fast can the 650 operate?
7. How fast can the 650 operate?
8. How fast can the 650 operate?
9. How fast can the 650 operate?
10. How fast can the 650 operate?
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45. How fast can the 650 operate?
46. How fast can the 650 operate?
47. How fast can the 650 operate?
48. How fast can the 650 operate?
49. How fast can the 650 operate?
50. How fast can the 650 operate?



How Data is Stored in IBM Data Processing Systems



Fig. 9. Communications from the information meetings.

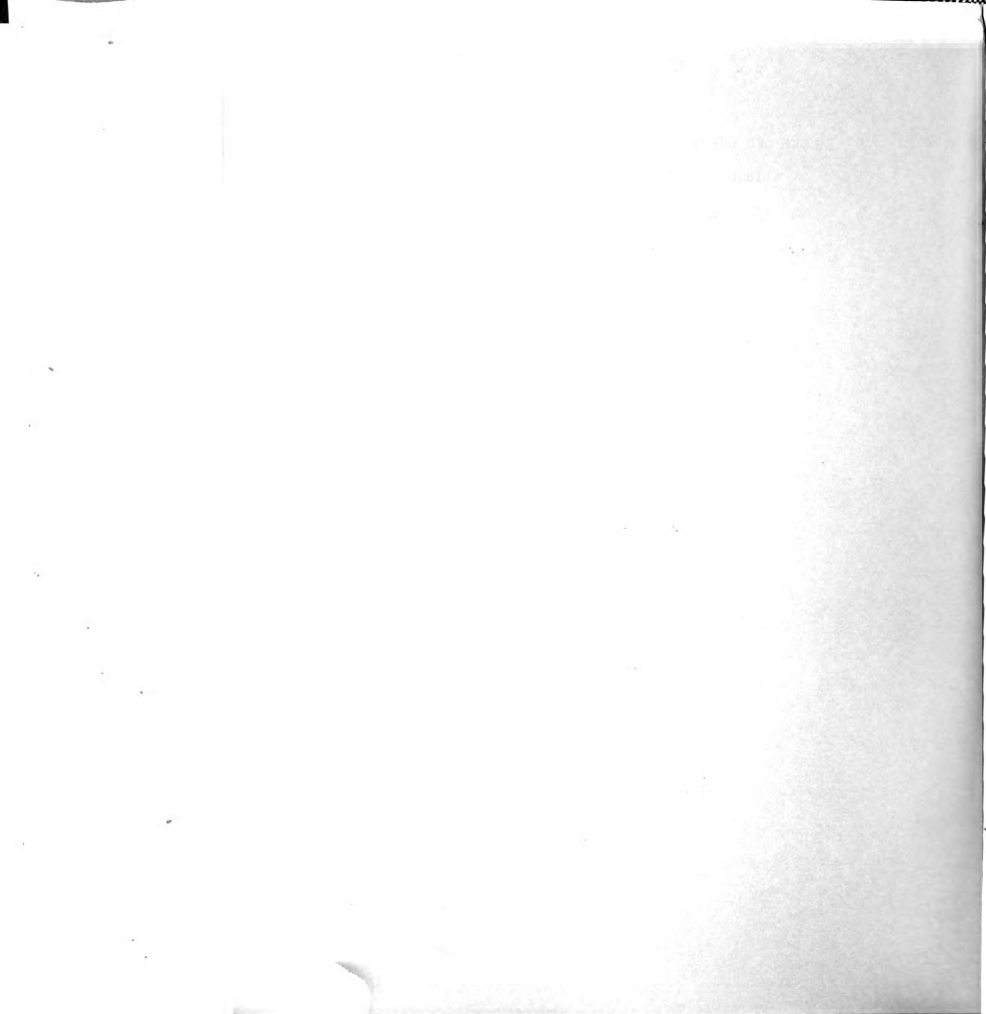
APPENDIX F

LABOR AND INDUSTRIAL RELATIONS CENTER

Michigan State University

SUPERVISORY QUESTIONNAIRE

Project OE 112-E-4



MICHIGAN STATE UNIVERSITY

OF AGRICULTURE AND APPLIED SCIENCE • EAST LANSING

LABOR AND INDUSTRIAL RELATIONS CENTER

Project OE 112-E-4

375

November 1957

To: Employees of [REDACTED] Insurance Company

The Labor and Industrial Relations Center at Michigan State University is carrying on a broad program of research having to do with people working together effectively in industrial organizations. Much of the research consists of getting the ideas and opinions of people about their jobs.

You are being asked to fill out a questionnaire as a part of this series of studies. Your answers, along with those from people in other organizations, will be analyzed to help discover what things are most important in making the working situation better for the people in it.

The value of this study depends upon the sincerity and care with which you answer the questions. It is important to get your real feelings. We are looking for frank statements about your attitudes, feelings, opinions and judgments about certain aspects of your job.

The answers that you give will be made available only to the research team in the Labor and Industrial Relations Center. No one connected in any way with your organization will see or use any of the individual questionnaires or be able in any way to find out what kind of answers you have given. Your information will be held in the strictest confidence and the results of the study will be tabulated on a group basis only.

Reports on the general findings from the study will be prepared for you, the company and the general public.

Einar Hardin
Research Associate
Labor and Industrial Relations Center
Michigan State University

Please print your name below. When you have finished the questionnaire, tear this part off and place it in the "ballot box" by the door. THIS INFORMATION WILL BE USED TO HELP US ANALYZE THE QUESTIONNAIRE. IT WILL NOT BE AVAILABLE TO ANYONE IN THE COMPANY.

Name _____

375

THE HISTORY OF THE

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GO THROUGH THESE QUESTIONS QUICKLY. CHOOSE THE ONE ANSWER THAT COMES CLOSEST TO THE WAY THAT YOU FEEL. PLACE A CHECK MARK (✓) IN THE SPACE IN FRONT OF YOUR CHOICE. PLEASE TRY TO ANSWER EVERY QUESTION.

I-40 Check the one statement that best describes the rate at which changes are taking place in the world today.

- 1. Much more rapidly than before.
- 2. Somewhat more rapidly than before.
- 3. At about the same rate as before.
- 4. Somewhat less rapidly than before.
- 5. Much less rapidly than before.
- 9. Don't know.

I-41 How do you feel about this?

- 1. I like it very much.
- 2. I like it.
- 3. It makes no difference to me.
- 4. I dislike it.
- 5. I dislike it very much.

I-42 In general, new developments in machines and processes for handling work:

- 1. Benefit all of the people.
- 2. Benefit most of the people.
- 3. Benefit some of the people.
- 4. Benefit only a few people.
- 5. Benefit only a very few people.
- 9. Don't know.

I-43 At what rate do you feel new developments in machines and methods for doing work are taking place?

- 1. Much less rapidly than is desirable.
- 2. Somewhat less rapidly than is desirable.
- 3. At about the ideal rate.
- 4. Somewhat more rapidly than is desirable.
- 5. Much more rapidly than is desirable.
- 9. Don't know.



I-44 Have new machines changed the tasks performed on your kind of job in the past year?

- 1. Yes, to a very large extent.
- 2. Yes, to a rather large extent.
- 3. Yes, to a moderate extent.
- 4. Yes, to a slight extent.
- 5. No, not at all.
- 9. Don't know.

I-45 How do you feel about this?

- 1. I like it very much.
- 2. I like it.
- 3. It makes no difference to me.
- 4. I dislike it.
- 5. I dislike it very much.

I-46 Have machines caused employees in insurance companies to transfer to different jobs within the company in the past year?

- 1. Yes, to a very large extent.
- 2. Yes, to a large extent.
- 3. Yes, to a moderate extent.
- 4. Yes, to a slight extent.
- 5. No, not at all.
- 9. Don't know.

I-47 How do you feel about this?

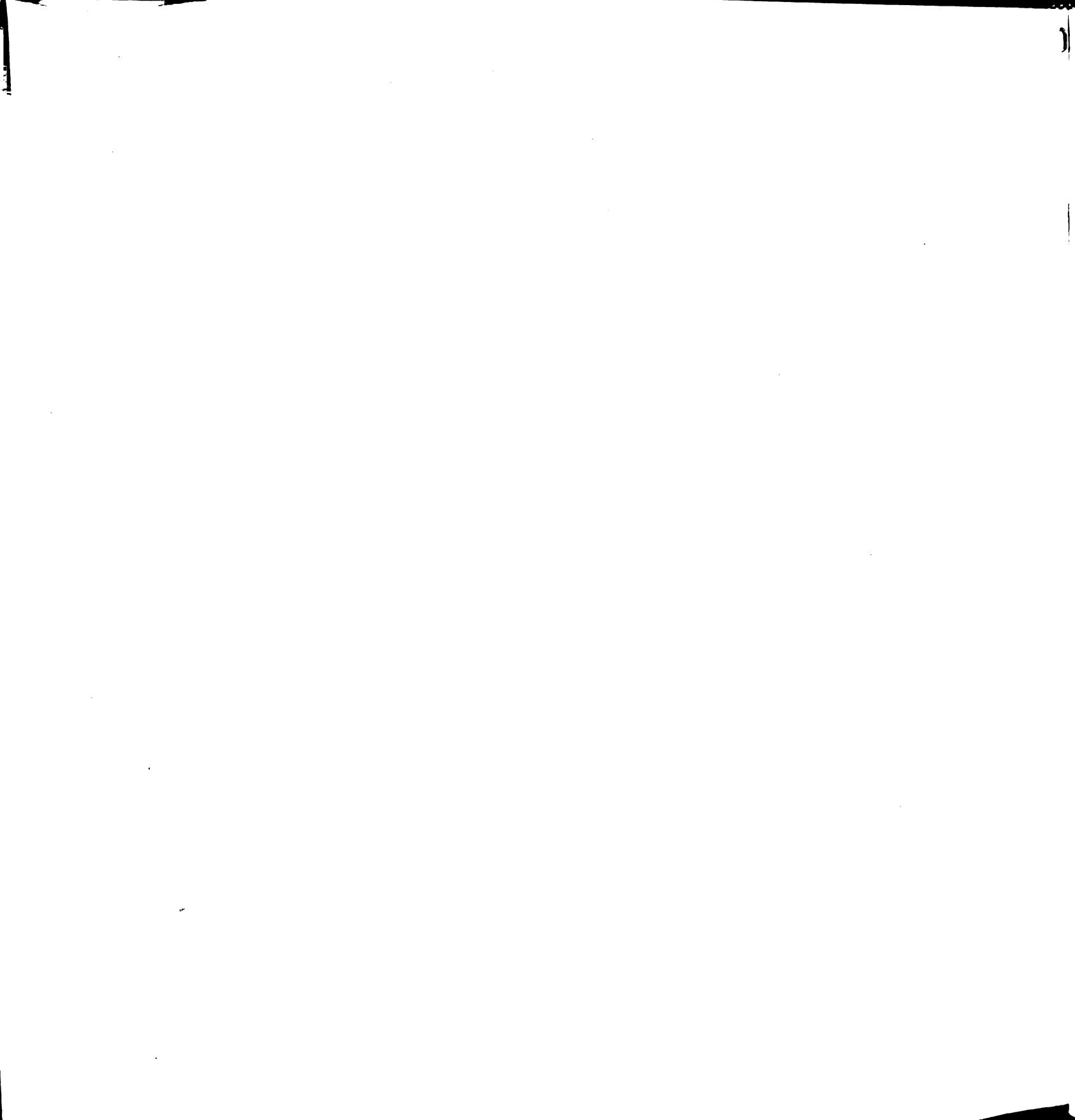
- 1. I like it very much.
- 2. I like it.
- 3. It makes no difference to me.
- 4. I dislike it.
- 5. I dislike it very much.

I-48 Have machines caused employees to lose their jobs in insurance companies in the past year?

- 1. Yes, to a very large extent.
- 2. Yes, to a large extent.
- 3. Yes, to a moderate extent.
- 4. Yes, to a slight extent.
- 5. No, not at all.
- 9. Don't know.

I-49 How do you feel about this?

- 1. I like it very much.
- 2. I like it.
- 3. It makes no difference to me.
- 4. I dislike it.
- 5. I dislike it very much.



I-50 Are the chances that a machine will cause you to do different work on your job greater or less than for most jobs in this company?

- 1. Much greater than for most jobs.
- 2. Somewhat greater than for most jobs.
- 3. Greater than some, less than others.
- 4. Somewhat less than for most jobs.
- 5. Much less than for most jobs.
- 9. Don't know.

I-51 How do you feel about this?

- 1. I like it very much.
- 2. I like it.
- 3. It makes no difference to me.
- 4. I dislike it.
- 5. I dislike it very much.

I-52 In your company, have employees lost their jobs because of machines in the past year?

- 1. Yes, to a very large extent.
- 2. Yes, to a large extent.
- 3. Yes, to a moderate extent.
- 4. Yes, to a slight extent.
- 5. No, not at all.
- 9. Don't know.

I-53 How do you feel about this?

- 5. I dislike it very much.
- 4. I dislike it.
- 3. It makes no difference to me.
- 2. I like it.
- 1. I like it very much.

I-54 What will happen to the total number of people doing your kind of job in insurance companies in the next five years?

- 1. Greatly increase.
- 2. Slightly increase.
- 3. Remain about the same.
- 4. Slightly decrease.
- 5. Greatly decrease.
- 9. Don't know.

I-55 How do you feel about this?

- 5. I dislike it very much.
- 4. I dislike it.
- 3. It makes no difference to me.
- 2. I like it.
- 1. I like it very much.

I-56 The job that you would consider ideal for you would be one where the way you do your work:

- 5. Is always the same.
- 4. Changes very little.
- 3. Changes somewhat.
- 2. Changes quite a bit.
- 1. Changes a great deal.

I-57 On the job that you have now, how much of your present work involves the use of office machines?

- 1. Almost all of it.
- 2. A large part of it.
- 3. Some of it.
- 4. A small part of it.
- 5. Almost none of it.
- 9. Don't know.

I-58 On the job that would be ideal for you, how much of your work would involve the use of office machines?

- 1. Almost all of it.
- 2. A large part of it.
- 3. Some of it.
- 4. A small part of it.
- 5. Almost none of it.
- 9. Don't know.

I-59 Do you feel that your kind of job will require more or less use of machines by 1960?

- 1. Much more use of machines.
- 2. Somewhat more use of machines.
- 3. A little more use of machines.
- 4. No more use of machines than now.
- 5. A little less use of machines.
- 9. Don't know.

I-60 In general, how much change takes place from time to time in the way you are expected to do your present job?

- 1. Much more change than for most jobs.
- 2. Somewhat more change than for most jobs.
- 3. About the same amount of change as for most jobs.
- 4. Somewhat less change than for most jobs.
- 5. A lot less change than for most jobs.

I-61 How do you feel about this?

- 5. I dislike it very much.
- 4. I dislike it.
- 3. It makes no difference to me.
- 2. I like it.
- 1. I like it very much.

On the next page you will find a list of statements about aspects of your job. You are asked to answer two questions about each aspect of your job. "Has this aspect of your job changed in the past six months?" (Question "A"), and "How do you feel about the change (or lack of change) in this aspect of your job?" (Question "B")

1. If you had the same job title here at [redacted] six months ago, compare the way your job is now with the way it was six months ago on each of the job aspects.

2. If you had a different job here at [redacted] six months ago, compare your present job with the job you had six months ago on each of the job aspects.

3. If you have not been with [redacted] for at least six months, indicate any changes which have occurred in the aspects of your job since you came to [redacted].

Example: Suppose the statement had to do with hours of work. If you are working more hours now ("A") and don't like it ("B"), you would check the spaces like this:

QUESTION "A"					QUESTION "B"				
How has this aspect of your job changed in the past six months?					How do you feel about this change (or lack of change) in your job?				
much more now	more now	no change	less now	much less now	like a lot	like	don't care	dis-like	dis-like a lot
	✓							✓	

The hours I work on this job....

QUESTION "A"

How has this aspect of your job changed in the past six months?

QUESTION "B"

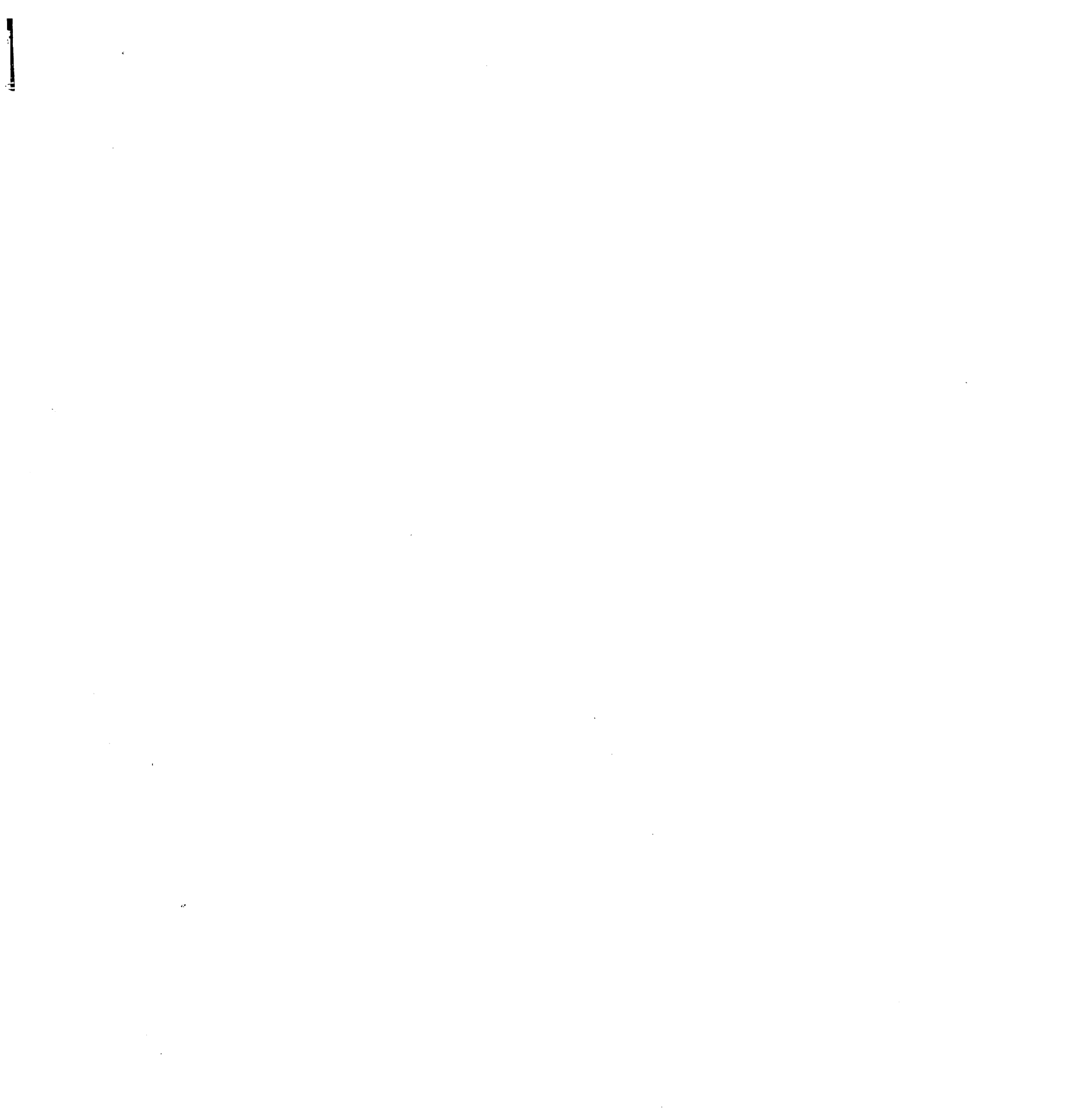
How do you feel about this change (or lack of change) in your job?

ANSWER QUESTIONS "A" AND "B" FOR EACH OF THESE STATEMENTS

much more now no change now less now much less now

like it a lot don't care dislike like it a lot

Table with 14 rows of statements and 4 columns of response options. Statements include: 1. The amount of variety in my work... 2. The amount of work required on my job... 3. The degree of accuracy demanded by my job... 4. My control over the pace of my work... 5. The importance of my job for the company... 6. The amount of supervision I get on my job... 7. The amount of skill needed on my job... 8. The amount of responsibility demanded by my job... 9. The amount of planning I have to do on my job... 10. The amount of judgment I have to use on my job... 11. The degree to which my work is interesting... 12. The amount of security I feel on my job... 13. My chances for promotion to a better job... 14. The amount of pay I get on my job.



The following questions are concerned with the contacts you have with other people in your work and with how you feel about the information you receive regarding changes in your job.

S II-40 During a regular workday I generally exchange information connected with my work with the following number of people:

- 1. None
- 2. 1 - 2
- 3. 3 - 5
- 4. 6 - 10
- 5. More than 10

S II-41 My job requires me to give information to my own superior:

- 1. Very frequently
- 2. Often
- 3. Sometimes
- 4. Seldom
- 5. Very infrequently

S II-42 When there is some gossip or information in the "grape-vine":

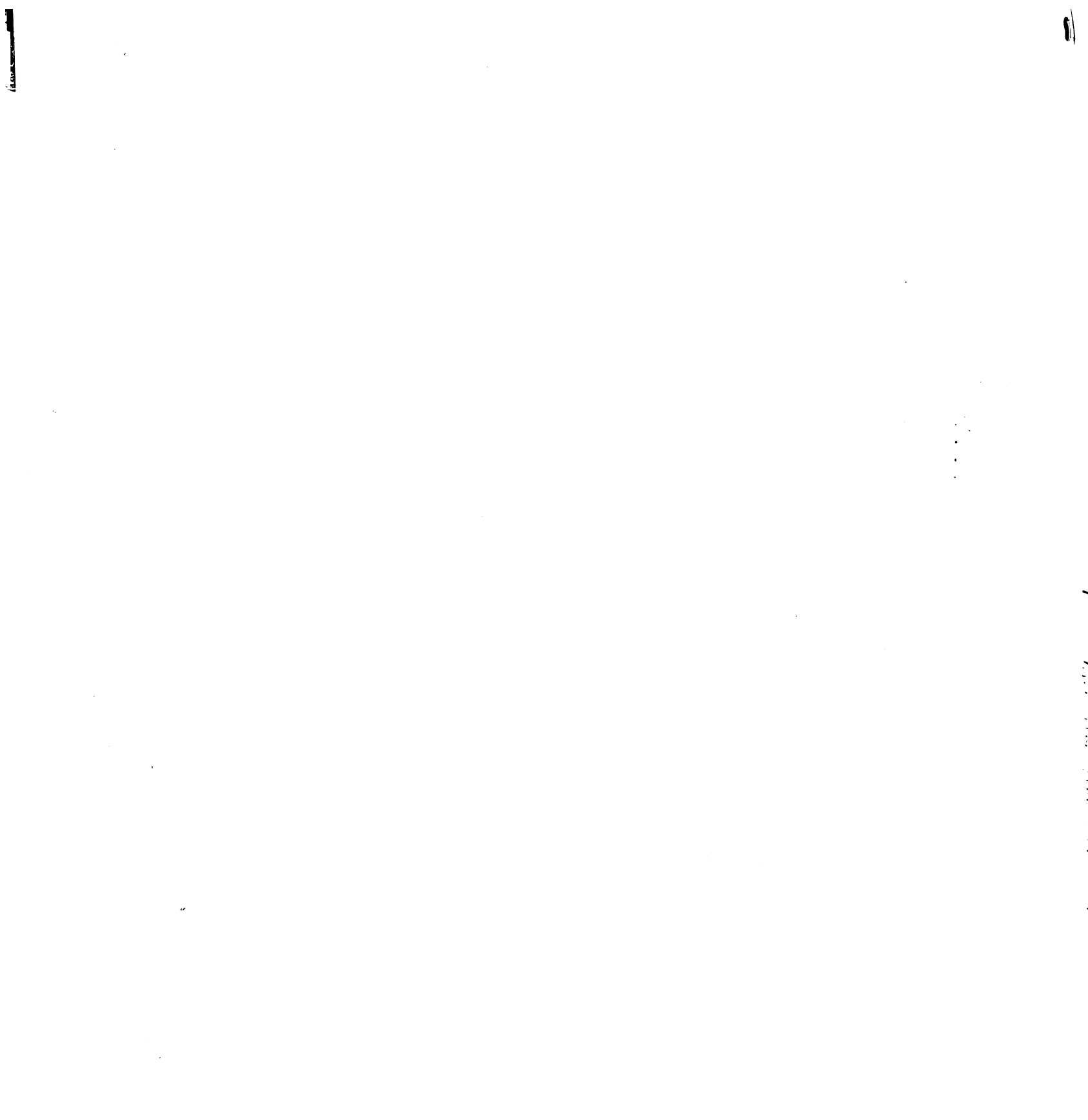
- 1. I am always the first one to hear about it.
- 2. I am usually one of the first to hear about it.
- 3. I hear about it at about the same time as everyone else does.
- 4. I am always one of the last to hear about it.
- 5. I never hear about it.

S II-43 How satisfied are you with the information you receive concerning changes in the company and in your job?

- 1. Completely satisfied
- 2. Very satisfied
- 3. Quite satisfied
- 4. Somewhat satisfied
- 5. Not satisfied

S II-44 How satisfied are you with the number of opportunities you have to talk with the people you supervise?

- 1. Completely satisfied
- 2. Very satisfied
- 3. Quite satisfied
- 4. Somewhat satisfied
- 5. Not satisfied



S II 45 How satisfied are you with the opportunity you have to discuss things with your immediate supervisor regarding your job?

- 1. Completely satisfied
- 2. Very satisfied
- 3. Quite satisfied
- 4. Somewhat satisfied
- 5. Not satisfied

S II 46 How much information has the company given the employees this fall?

- 1. Much more than usual
- 2. More than usual
- 3. About the same as usual
- 4. Less than usual
- 5. Much less than usual

In the right-hand column next to each item, place a check mark under the statement which best describes your satisfaction with the information received from the company.

ASPECTS OF INFORMATION	Satisfaction				
	Completely satisfied	Very satisfied	Quite satisfied	Somewhat satisfied	Not satisfied
7 Amount of information.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18 Accuracy of information.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49 Understandability of information...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50 Getting information soon enough.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

As you may know, your company is planning to install an IBM "650" Computer in December. We are interested in how you think this machine may affect your job here at [REDACTED]. The following questions ask for your opinions as to what the effects may be.

II - 51 Which statement best describes the effect you expect the computer to have on you in the next six months?

- 1. I expect to be promoted.
- 2. I expect to be transferred to a different job.
- 3. I expect to keep the same job, but with the work greatly changed.
- 4. I expect to keep the same job, but with the work noticeably changed.
- 5. I expect to keep the same job with the work only slightly changed.
- 6. I expect to keep the same job with no change at all.
- 7. I don't expect to be affected for I plan to quit working soon.
- 8. Other (describe) _____
- 9. I have no idea.

II - 52 How do you feel about this?

- 1. I like it very much.
- 2. I like it.
- 3. It makes no difference to me.
- 4. I dislike it.
- 5. I dislike it very much.

II - 53 Do you think that the computer will influence your job in the next year or two?

- 1. It is very likely.
- 2. It is quite likely.
- 3. It is possible, but not very likely.
- 4. It is not very likely.
- 5. It is not at all likely.
- 6. I have no idea.

II - 54 How do you feel about this?

- 1. I like it very much.
- 2. I like it.
- 3. It makes no difference to me.
- 4. I dislike it.
- 5. I dislike it very much.

II-55 What is your general feeling about the fact that the company has decided to install the computer?

- 1. I like it very much.
- 2. I like it.
- 3. It makes no difference to me.
- 4. I dislike it.
- 5. I dislike it very much.

II-56 Why do you feel this way? _____

The following items deal with company information about the IBM "650":

S III-40 I can recall first hearing that the company was installing an IBM "650" computer:

1. More than a year ago
2. Between six months and one year ago
3. Several months ago
4. A few weeks ago
5. A few days ago
6. I didn't know until today that a computer was to be installed.

S III-41 Of the information distributed about the IBM "650" computer prior to its installation I think I have received:

1. All of it
2. Most of it
3. Some of it
4. Only a little of it
5. None of it

S III-42 I have discussed the IBM "650" computer with others:

1. Very often
2. Often
3. Sometimes
4. Not often
5. Never

S III-43 Of the information I have received about the IBM "650" computer prior to its installation I felt it was necessary to pass along:

1. All of it
2. Most of it
3. Some parts of it
4. Only a little of it
5. None of it

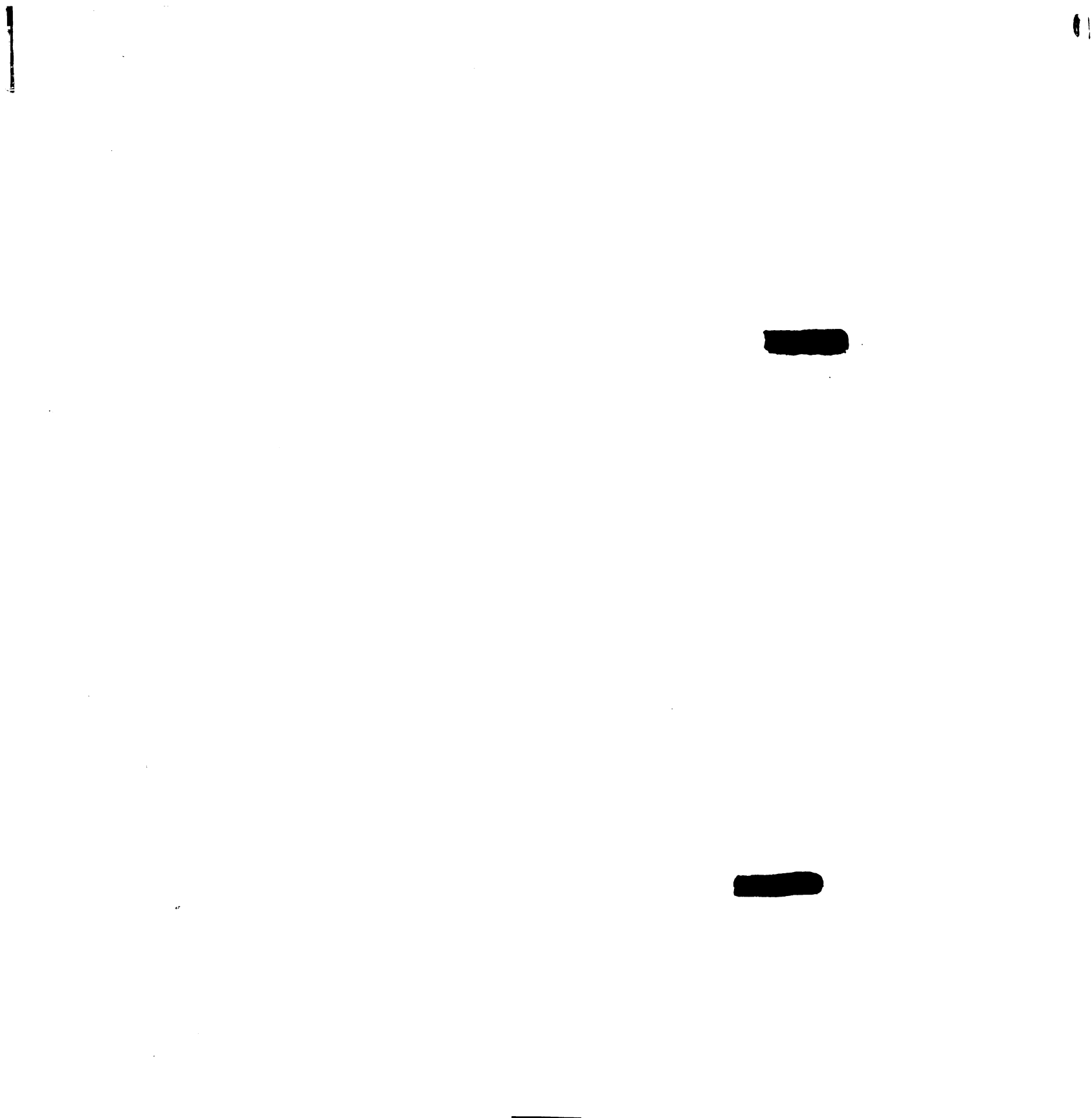
The company has made various statements and announcements in connection with the preparations for the computer. Some have been made in [REDACTED] some have been made in special bulletins, and some may have been made in information meetings or by your direct supervisor. We are interested in finding out how well the information has reached you. In the table below there is a series of statements. For each of the statements indicate, to the best of your knowledge, whether the company has: (A) made any statement with that meaning, (B) made any statement with the opposite meaning, or (C) not said anything about the subject.

STATEMENT	The company has:		
	<u>A</u> Said so	<u>B</u> Said the opposite	<u>C</u> Said nothing about the subject
<i>III</i> 44 The computer will not make any mistakes of its own.....	—	—	—
<i>III</i> 45 The computer cannot correct errors that exist in the data it receives.....	—	—	—
<i>III</i> 46 The IBM 650 programmer will spend a lot of time preparing coded instructions for the machine.....	—	—	—
<i>III</i> 47 Most of the time the computer will be operated by the IBM 650 programmer.....	—	—	—
<i>III</i> 48 One of the immediate tasks of the IBM 650 programmer is to develop a procedure for figuring payroll on the computer.....	—	—	—
<i>III</i> 49 The IBM 650 computer can be operated properly only by people who know some electrical engineering.....	—	—	—
<i>III</i> 50 It has become necessary to write a detailed procedural manual for preparation of data to be used in the computer.....	—	—	—
<i>III</i> 51 The computer will change the work methods in all parts of the company.....	—	—	—

1

(Continuation of table on page 14)

STATEMENT	The company has:		
	<u>A</u> Said so	<u>B</u> Said the opposite	<u>C</u> Said nothing about the subject
<i>III</i> - 52 Representatives of the IBM Corporation say that [REDACTED] is doing quite well in preparing for the computer.....	—	—	—
<i>III</i> - 53 The computer will be handled by the automobile underwriting department.....	—	—	—
<i>III</i> - 54 There will be a lot more people needed in the IBM accounting department as a result of the computer.....	—	—	—
<i>III</i> - 55 The company will be able to issue policies more quickly thanks to the computer.....	—	—	—
<i>III</i> - 56 The computer will soon be used for deciding which applications the company should accept and which it should reject.....	—	—	—
<i>III</i> - 57 The computer will first be used for figuring loss ratios for each of the agents.....	—	—	—
<i>III</i> - 58 The computer will figure out how the company should settle claims from a policyholder.....	—	—	—
<i>III</i> - 59 The computer will not endanger anybody's employment at [REDACTED]	—	—	—



Now we would like to know what you personally think will happen as a result of the computer. Below are several questions. Mark your answer in one of the columns "Yes", "Possibly", and "No", depending on your opinion.

	<u>In your opinion:</u>	Your answer		
		Yes	Possibly	No
III-60	Will the computer make mistakes of its own?.....	—	—	—
III-61	Will the computer change the work methods in all parts of the company?.....	—	—	—
III-62	Will the company be able to issue policies more quickly thanks to the computer?.....	—	—	—
III-63	Will the computer soon be used for deciding which applications the company should accept and which it should reject?.....	—	—	—
III-64	Will the computer endanger anybody's employment at [redacted]?.....	—	—	—
III-65	Will the computer make jobs too difficult to understand for a lot of people?.....	—	—	—
III-66	Will a lot of people be able to use more of their skills as a result of the installation of the computer?.....	—	—	—
III-67	Will the computer actually help increase employment at [redacted]?.....	—	—	—



The following items deal with preferences about changes in your job:

IV-40 If I could do as I pleased, I would change the kind of work I do every few months.

- 5. I strongly agree
- 4. I agree a little
- 3. I neither agree nor disagree
- 2. I disagree a little
- 1. I strongly disagree

IV-41 One can never feel at ease on a job where the ways of doing things are always being changed.

- 1. I strongly agree
- 2. I agree a little
- 3. I neither agree nor disagree
- 4. I disagree a little
- 5. I strongly disagree

IV-42 The trouble with most jobs is that you just get used to doing things in one way and then they want you to do them differently.

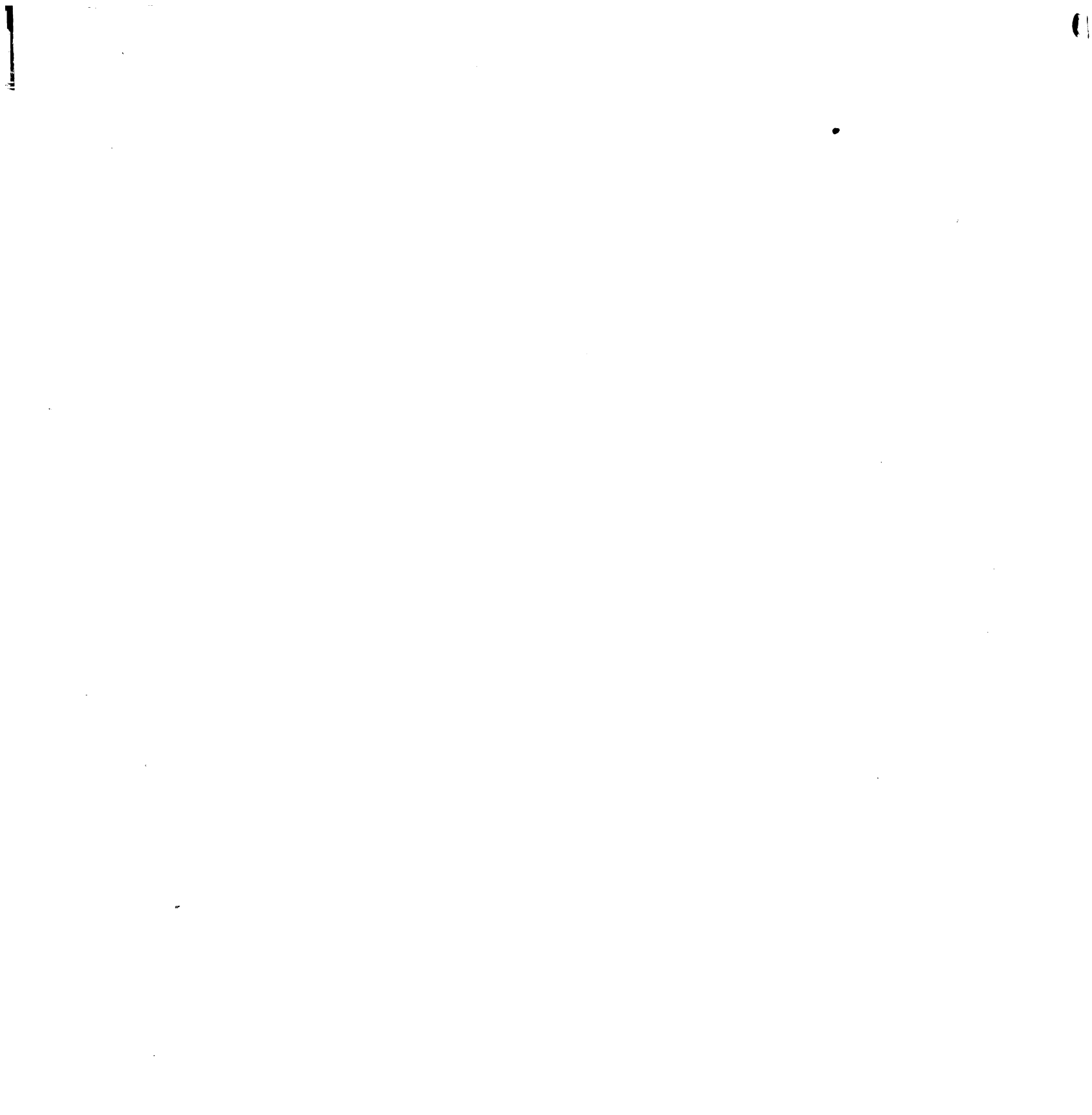
- 1. I strongly agree
- 2. I agree a little
- 3. I neither agree nor disagree
- 4. I disagree a little
- 5. I strongly disagree

IV-43 I would prefer to stay with a job I know I can handle than to change to one where most things would be new to me.

- 1. I strongly agree
- 2. I agree a little
- 3. I neither agree nor disagree
- 4. I disagree a little
- 5. I strongly disagree

IV-44 The trouble with many people is that when they find a job they can do well they don't stick with it.

- 1. I strongly agree
- 2. I agree a little
- 3. I neither agree nor disagree
- 4. I disagree a little
- 5. I strongly disagree



IV-45 I like a job where I know that I will be doing my work about the same way from one week to the next.

- 1. I strongly agree
- 2. I agree a little
- 3. I neither agree nor disagree
- 4. I disagree a little
- 5. I strongly disagree

IV-46 When I get used to doing things in one way it is disturbing to have to change to a new method.

- 1. I strongly agree
- 2. I agree a little
- 3. I neither agree nor disagree
- 4. I disagree a little
- 5. I strongly disagree

IV-47 It would take a sizable raise in pay to get me to accept a different job here.

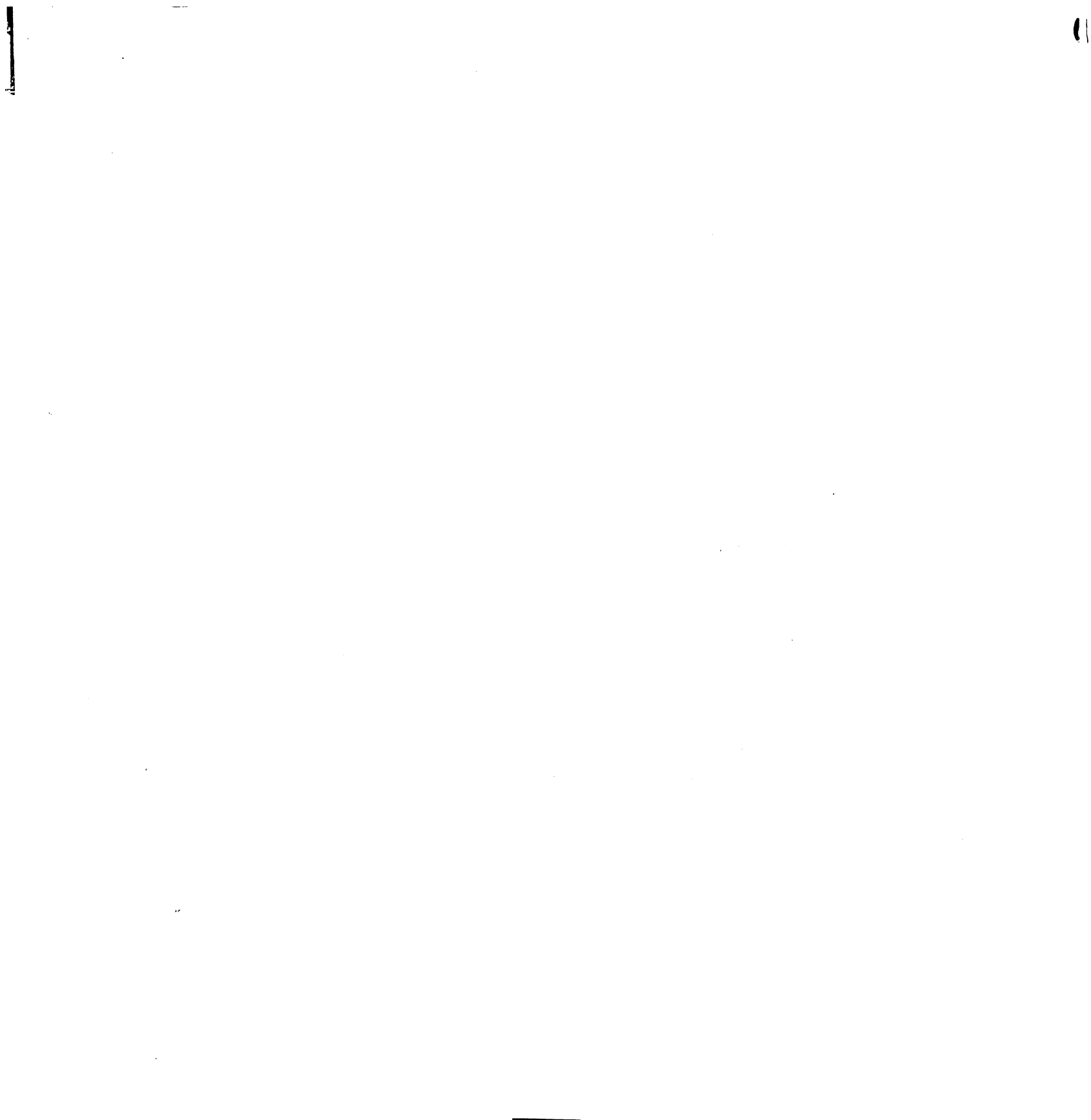
- 1. I strongly agree
- 2. I agree a little
- 3. I neither agree nor disagree
- 4. I disagree a little
- 5. I strongly disagree

IV-48 There are many unnecessary tasks performed in this company.

- 1. I strongly agree
- 2. I agree
- 3. I neither agree nor disagree
- 4. I disagree
- 5. I strongly disagree

IV-49 This company is slow in adopting more efficient methods of work.

- 1. I strongly agree
- 2. I agree
- 3. I neither agree nor disagree
- 4. I disagree
- 5. I strongly disagree



IV-50 It is hard to gain acceptance of proposals for changes that would lead to increased efficiency.

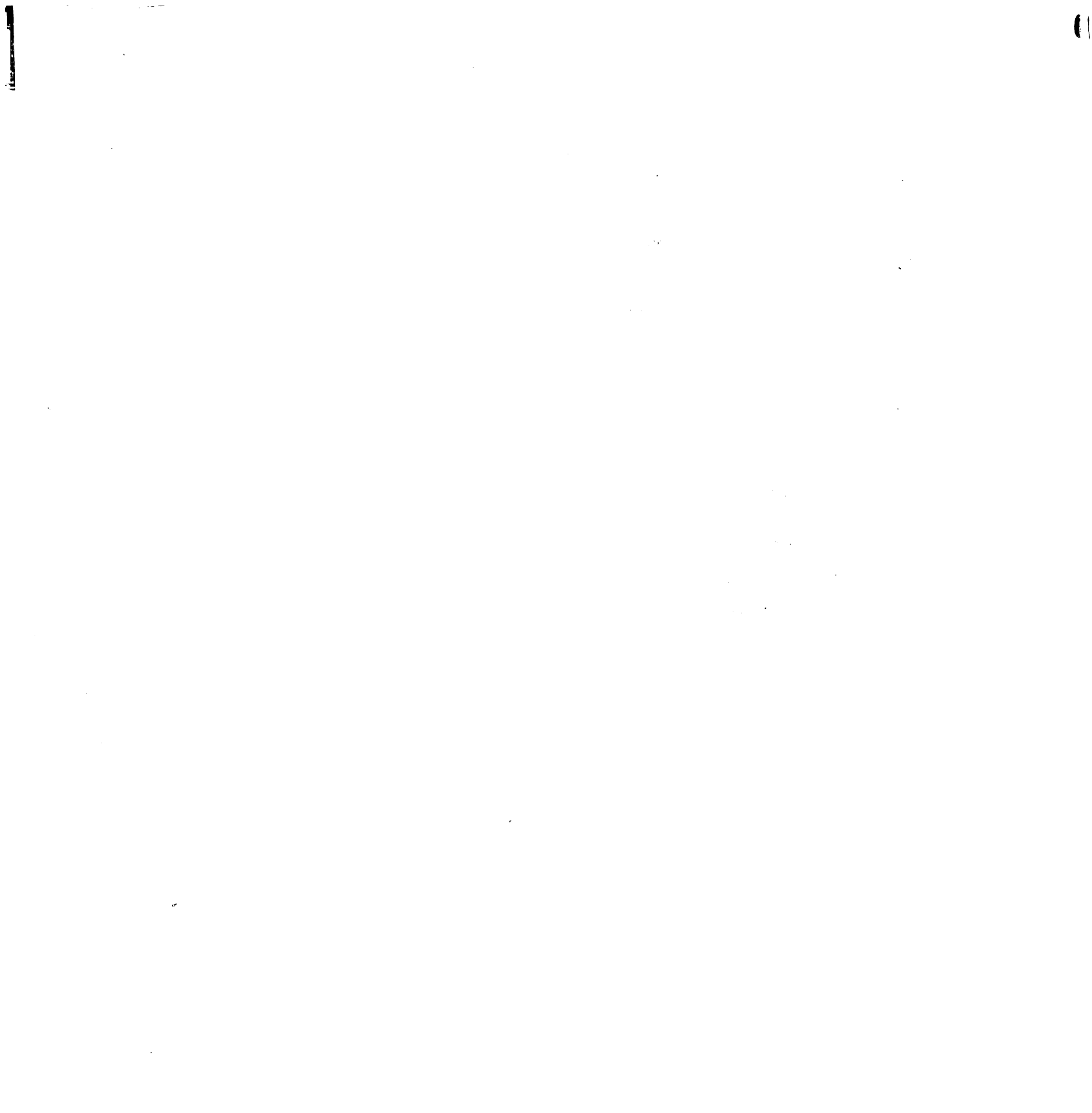
- 1. I strongly agree
- 2. I agree
- 3. I neither agree nor disagree
- 4. I disagree
- 5. I strongly disagree

IV-51 Many persons in this company are so used to doing things in the present way that they cannot see the advantages of new methods of work.

- 1. I strongly agree
- 2. I agree
- 3. I neither agree nor disagree
- 4. I disagree
- 5. I strongly disagree

IV-52 Personal interests are too often allowed to stand in the way of improved efficiency in this company.

- 1. I strongly agree
- 2. I agree
- 3. I neither agree nor disagree
- 4. I disagree
- 5. I strongly disagree



The purpose of the following questions is to get your idea about the practical value of different supervisory practices for this organization. We are not asking you which method would be ideal nor which method is now actually being followed in your department. Instead, we are asking you to tell us which method you consider the most effective supervisory method in this organization.

Directions: Check the one answer which you feel would be the most effective supervisory method for each situation. Sometimes you may not see much difference between two or more of the choices or may not like any of them. Always make a choice even if you are forced to guess.

SIV-42 The real function of staff specialists is to

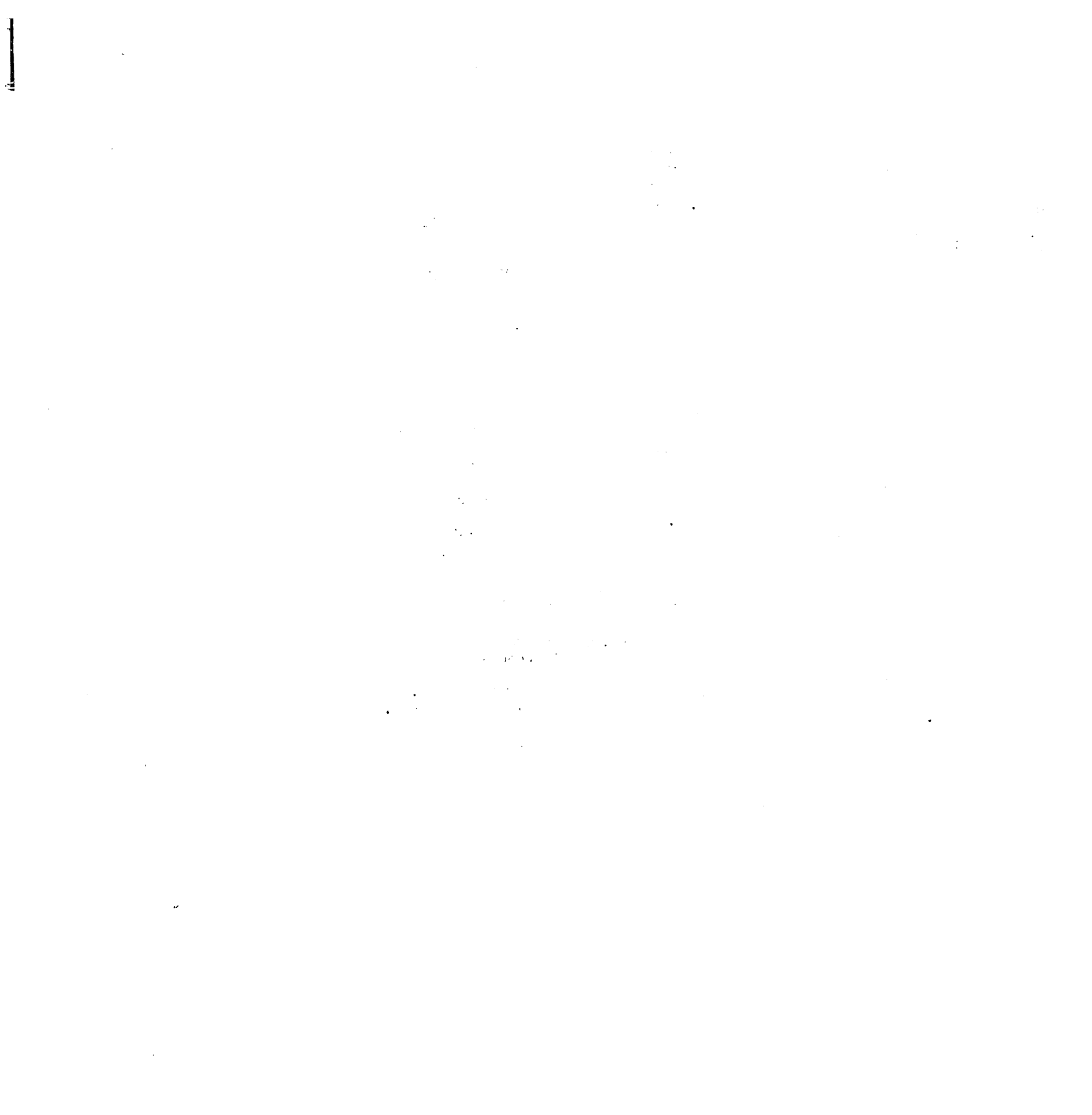
- 1. provide factual material that the supervisor can use in building up the technical efficiency of his own department.
- 2. provide the supervisor with new ideas that he can use to stimulate his men and keep them interested in improving their efficiency.
- 3. develop reliable methods and programs that the supervisor can use and depend on.
- 4. provide qualified people that the supervisor can call on when his department needs help in solving problems.

SIV-43 When usual methods fail to get action on an important departmental problem, the supervisor's best bet for getting results is

- 1. the advice and backing of his immediate superior.
- 2. the employees, who can informally back his request for action.
- 3. his own organized and forceful presentation of the facts.
- 4. his informal personal contacts with key people in the plant.

SIV-44 To understand how the employees really feel about things, the supervisor should

- 1. maintain a frank, informal, give-and-take relationship with them.
- 2. keep objective records of things that reflect their feelings -- like production, absenteeism, suggestions, and complaints.
- 3. arrange for informal private interviews with each employee.
- 4. notice their reactions to the work, to him, and to his orders.



S.V-45 When a supervisor gets an order that doesn't seem justified and that the employees dislike, he should

- _____ 1. study the order; then either change it so that he can personally justify its enforcement or send it back up the line with his objections.
- _____ 2. realize that everyone makes mistakes, and save his superiors unnecessary trouble by explaining the order in such a way that the employee will accept it.
- _____ 3. realize that there probably is a good reason for the order, and that if future orders are to be respected, this one must be carried out.
- _____ 4. explain to the employees that as supervisor he must see that the order is carried out, but that he'll help them organize their criticisms of it for presentation up the line.

S.V-46 If official policies are really to be followed, they should be

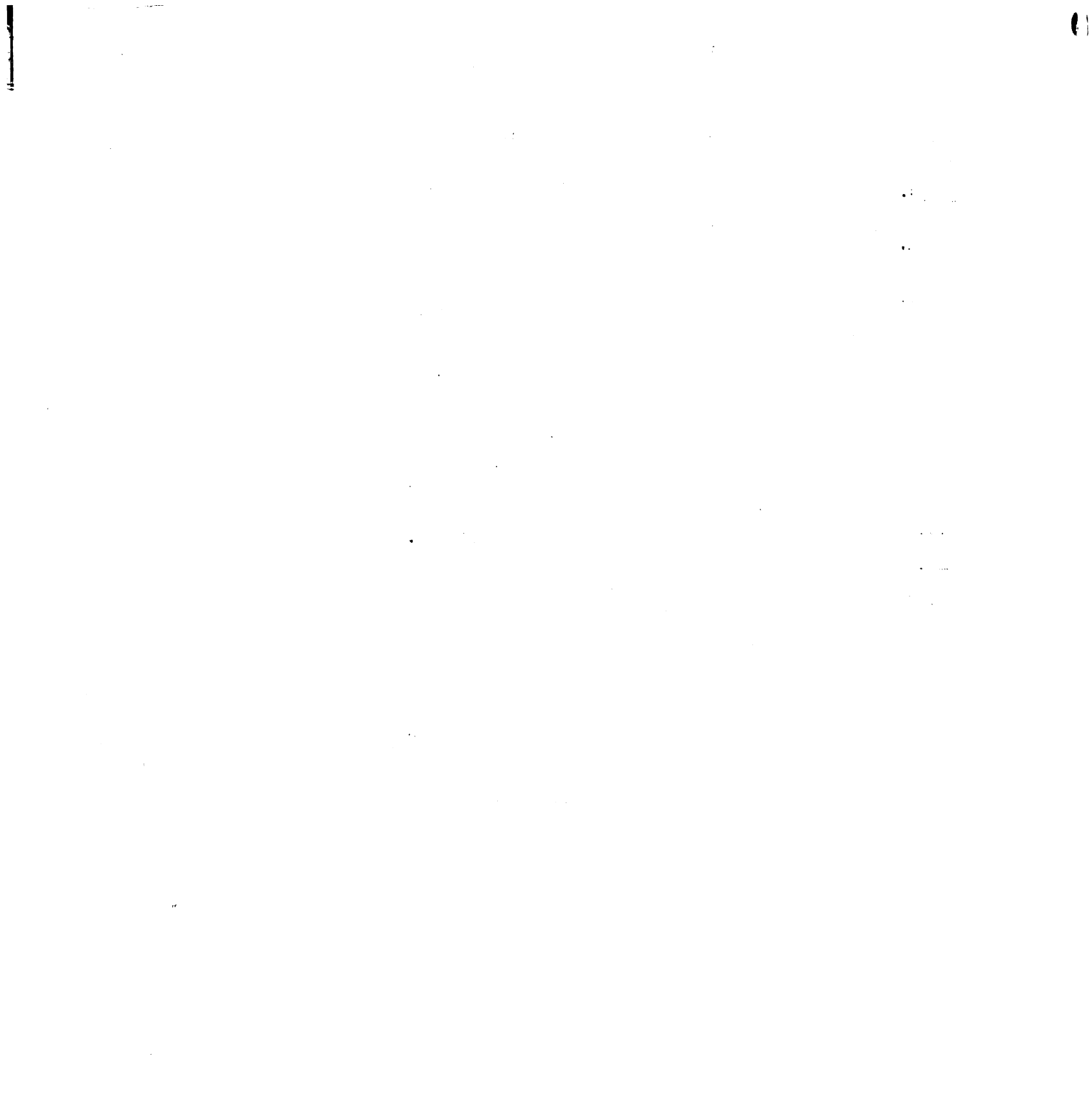
- _____ 1. clearly presented in the supervisor's handbook, with the names of the authorities to consult when any questions come up.
- _____ 2. presented as general guides for the employees, who should be able to get unpopular policies reconsidered.
- _____ 3. laid out as general rules that the supervisor is authorized to interpret and apply in his department.
- _____ 4. set up as general guides that the supervisor can change slightly to fit individual cases and problems.

S.V-47 The best way to get steady and dependable production is

- _____ 1. praising employees when they deserve it, and appealing to their desires for self-improvement.
- _____ 2. careful direction and disciplining of employees.
- _____ 3. to establish a pay schedule based on a job evaluation.
- _____ 4. through the employees' desire to be part of a satisfying work team.

S.V-48 The best level of coordination between departments comes mostly from

- _____ 1. training supervisors to handle minor problems between departments diplomatically, to avoid unnecessary conflicts.
- _____ 2. selecting supervisors who really know their work and take pride in competing with each other to get out first-class work.
- _____ 3. having a clear-cut delegation of authority for each department so that there is absolutely no overlapping of responsibility between supervisors.
- _____ 4. developing supervisory planning sessions in which the supervisors work out solutions to conflicts between departments.



SV-49 The average supervisor needs development most in

1. the proper use of official channels and forms for making reports, filing complaints, handling transfers, requisitioning, etc.
2. how to understand the employees' ideas, problems, and standards.
3. the basic technical knowledge he'll need in the department he's supervising.
4. the ways to deal with individuals efficiently without causing friction.

SIV-50 If several employees are led informally by a very uncooperative individual, the supervisor should

1. ask the personnel department to have the leader transferred.
2. call them all in and talk the problem through with them.
3. discredit this rival leader by showing the group how and where he is wrong.
4. interest the leader in something else, and give the men more individual attention.

SV-51 When hiring a new employee, the supervisor should select a man who is

1. intelligent and has a good deal of drive.
2. a hard worker and who doesn't need much supervision.
3. open-minded and willing to share responsibilities.
4. agreeable and willing to follow the regulations.

SIV-52 When a major reorganization of the employees' work is necessary in his department, the supervisor should

1. ask the personnel department to reassign the employees impartially.
2. call the employees together and get their suggestions about the reorganization.
3. use this opportunity to shift employees to jobs where each of them will feel happiest and thus work best.
4. use his own judgment and assign each employee to the kind of work the supervisor knows he does best.

SIV-53 An ideal supervisor should

1. avoid use of authority, and respect the employees' opinions and attitudes while helping them to work out common standards and methods of efficiency.
2. avoid making snap judgments, and distribute both duties and privileges impartially.
3. avoid "passing the buck" and make prompt, firm, clear decisions that his employees will respect and follow.
4. avoid unnecessary conflicts, and use praise and personal attention to help each individual develop his abilities.

SV-54 Employees will turn out the highest production if the supervisor

1. helps them work out departmental standards and teamwork that fit current needs.
2. sees that the work is carried out according to the specific instructions given by higher management.
3. uses psychology to aid each individual in developing himself to his highest potential.
4. uses his practical knowledge, initiative, and organizing ability to run his department at maximum efficiency.

SV-55 To maintain departmental discipline, the supervisor should

1. help the employees work out a common standard of action based on the rules.
2. treat all employees alike and according to the established rules.
3. see to it that each employee learns company rules and can therefore be responsible for his own conduct.
4. take direct personal action on anyone who commits a serious violation of company rules.

SV-56 A smooth-running department depends mostly on

1. how well the supervisor helps each employee to realize and use his abilities.
2. how well the supervisor plans and directs the work.
3. the understanding, responsibility, and teamwork developed by the work force.
4. the systematic breakdown of the work load into separate and clearly described job duties for each employee.

SV-57 The rating or promotion of an employee should be based primarily on

1. the ambition and ability to learn that he has shown.
2. his technical knowledge and ability, and his departmental experience.
3. objective records showing the amount of experience he's had, his length of employment, and his job skills.
4. the recommendations of a supervisor-employee merit-rating committee.

SV-58 If an employee keeps coming in with an unreasonable complaint, the supervisor should

1. help him to become interested in something more constructive.
2. politely but firmly show him just why the complaint is not justified.
3. talk the problem over with him, trying to understand how he feels about it.
4. send him up the line to the proper authority for an official and final answer that the employee will have to accept.

SV-59 Informal personal relationships between supervisor and employees should be

1. accepted the same way as any other friendship in which there is mutual respect of one another's opinions and individuality.
2. avoided, because a supervisor who mingles with his employees loses their respect of him as a fair and impartial judge of their merits.
3. generally avoided, except when the employee has been outstandingly responsible in his work and would make a good assistant in the department.
4. encouraged, so that the supervisor can get to know each man's interests and stimulate him to develop his abilities.

SV-60 An employee's suggestion for an improvement in the department should be

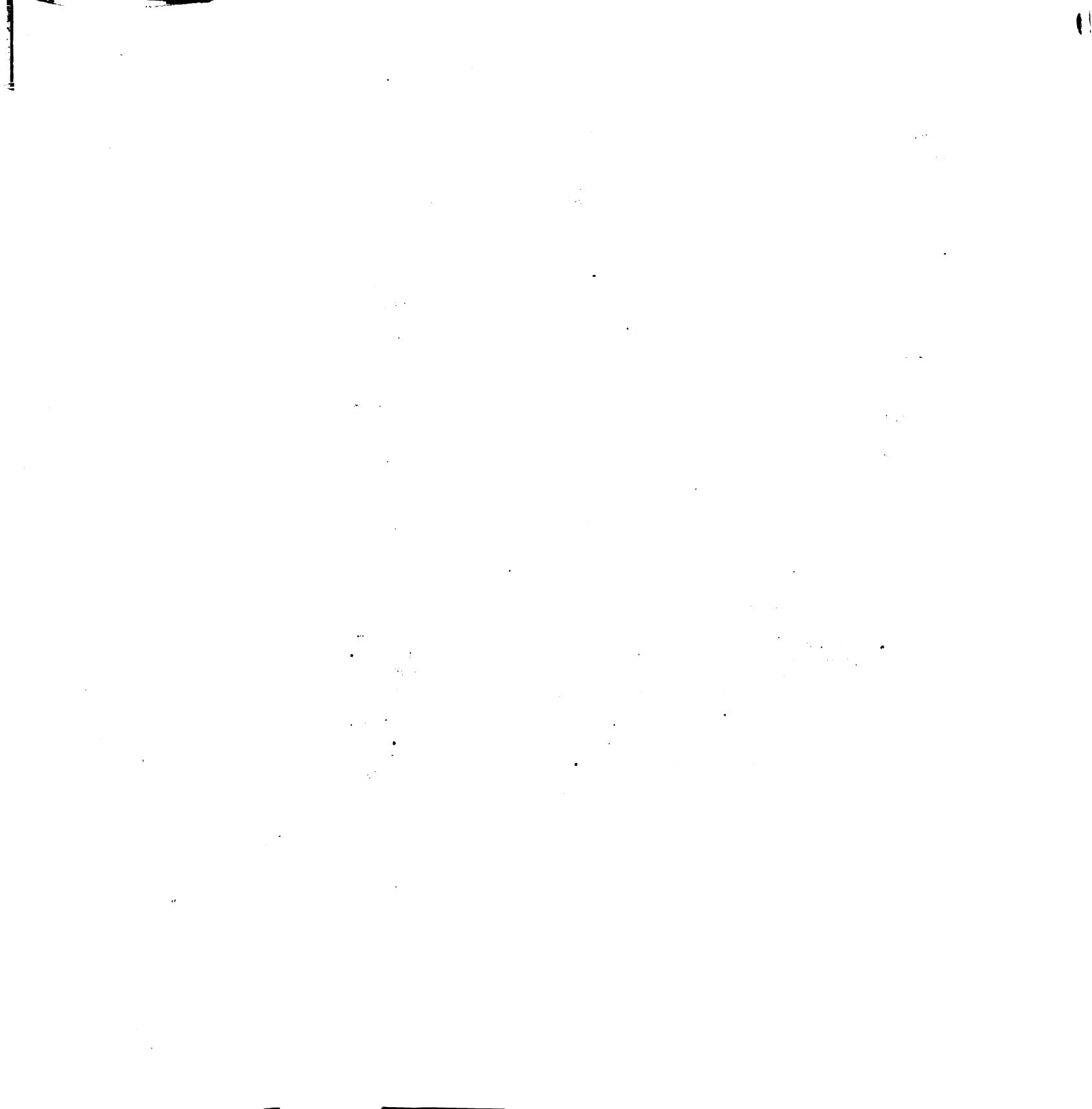
1. passed up through the supervisor, whose knowledge of the technical needs of the department may enable him to improve the suggestion.
2. encouraged by the supervisor, so that the employee's initiative is developed and supported.
3. passed around among others in the department for their comments and suggestions before it's sent up.
4. sent directly to the Operating Committee.

SV-61 A supervisor should train a new employee by

1. showing him repeatedly how to do the job, until the supervisor sees that he's developed efficient work habits in it.
2. making the job interesting to him by praising him when he does it well and correcting him tactfully when he shows his weak points.
3. giving him a complete written set of instructions to study, so that he can learn the right methods from the start.
4. explaining what the job requires, then allowing him to develop his own methods from the supervisor's suggestions and his own experience and knowledge.

SV-62 When a new program begins, the supervisor should get

1. enough information and freedom in carrying it out so that he can meet the personal needs of individual employees.
2. firsthand information about his duties, and personal authority to carry them out in the way he thinks best.
3. advance information about the program, so that he can get his employees' ideas about it and then help develop it.
4. a clear description of his duties in the program, and a statement that he'll have the official backing needed to carry them out.



SIV-63 The supervisor can give out new orders and information most effectively by

1. discussing them with the employees and getting their questions and comments.
2. sending written notices to every employee concerned.
3. explaining the orders or information to each employee concerned.
4. telling each employee about them informally at the appropriate time and place.

SIV-64 A group leader would be most helpful to his supervisor if he

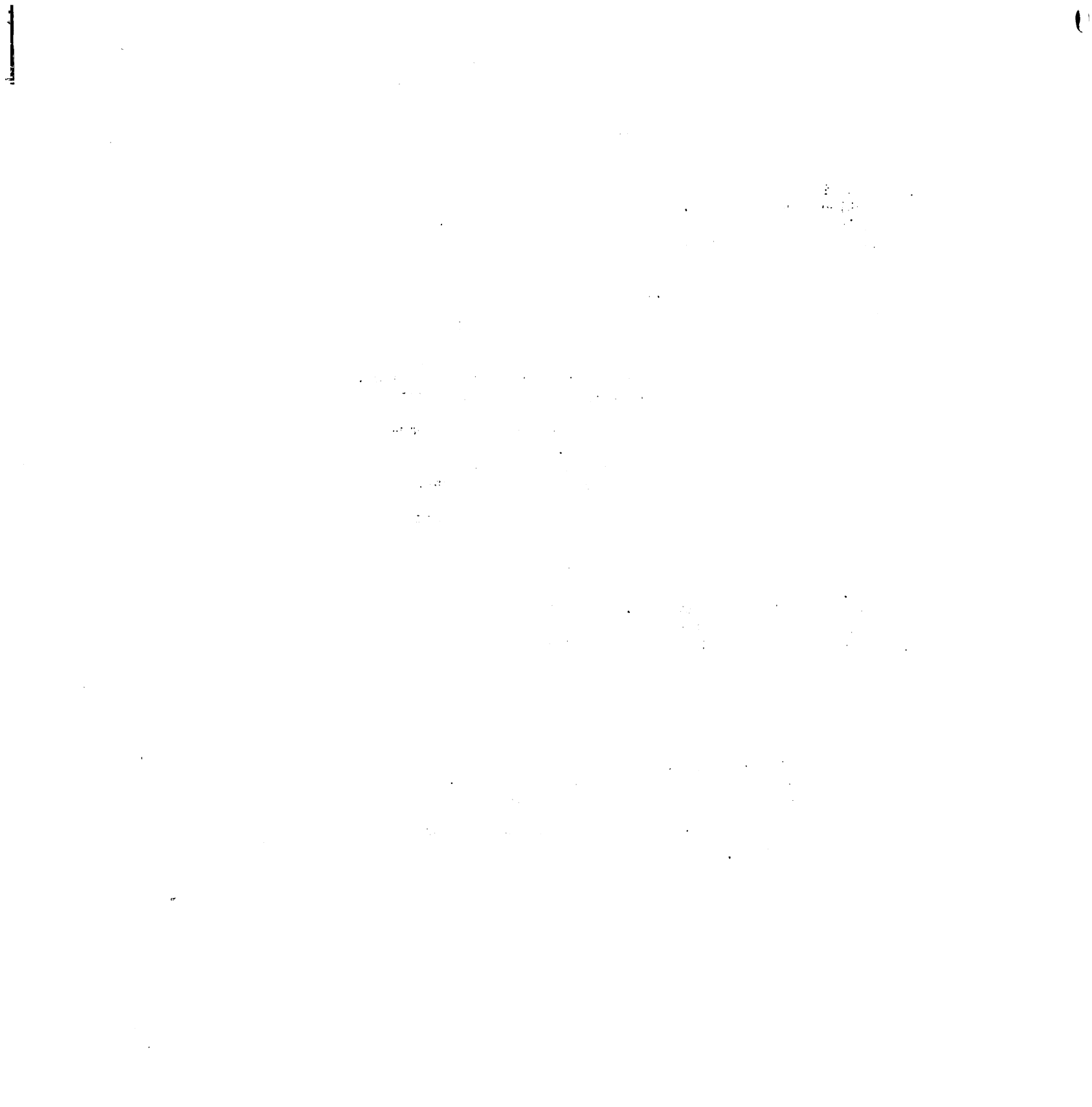
1. evaluated each employee's complaints and passed on only those which were legitimate grievances under the regulations.
2. helped the employees to organize and present their ideas about departmental problems.
3. disciplined employees who took unfair advantages of regulations to justify loafing on the job.
4. tried to help or advise individual employees who went to him to discuss their personal problems and complaints.

SIV-65 When a man is recommended for promotion to supervisor, the most important thing to consider is his

1. ability to use practical psychology in getting things done.
2. technical ability, initiative, creativity, and experience in the department.
3. understanding of, and respect for, official policies and programs.
4. standing among the employees as a leader.

SIV-66 A new employee will get along all right if he

1. works with the other men in his department in turning out the day's production.
2. follows the rules and regulations and is reliable.
3. really tries to take advantage of opportunities to improve himself.
4. follows the supervisor's instructions and develops the right work habits.



The following questions deal with your personal attitudes and opinions about a number of important social and personal questions. The best answer to each statement below is your personal opinion.

VI-40 Even though freedom of speech for all groups is a worthwhile goal, it is unfortunately necessary to restrict the freedom of certain political groups.

- 1. I disagree very much.
- 2. I disagree on the whole.
- 3. I disagree a little.
- 4. I agree a little.
- 5. I agree on the whole.
- 6. I agree very much.

VI-41 The worst crime a person could commit is to attack publicly the people who believe in the same thing he does.

- 6. I agree very much.
- 5. I agree on the whole.
- 4. I agree a little.
- 3. I disagree a little.
- 2. I disagree on the whole.
- 1. I disagree very much.

VI-42 It is only natural that a person would have a much better acquaintance with ideas he believes in than with ideas he opposes.

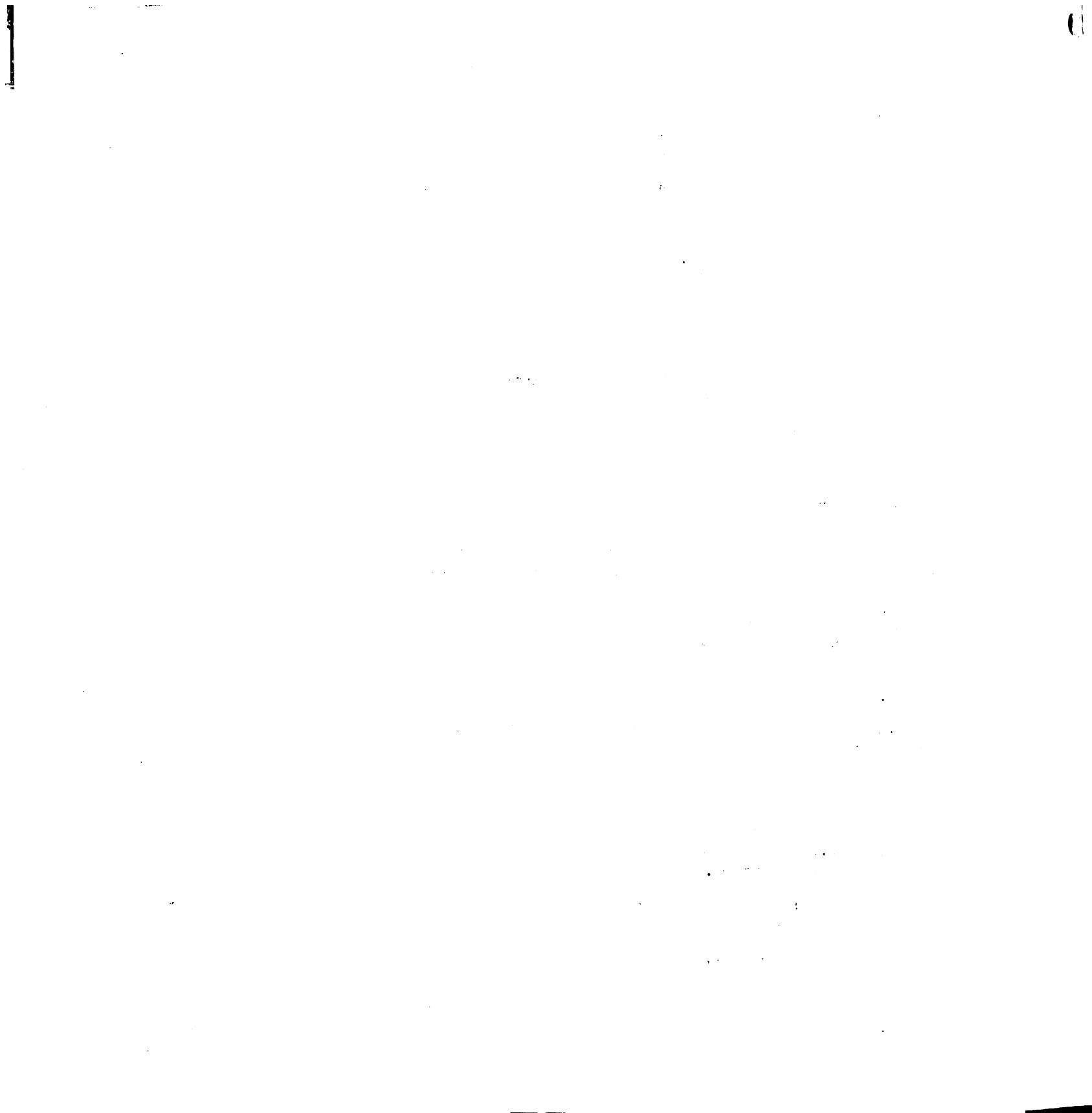
- 1. I disagree very much.
- 2. I disagree on the whole.
- 3. I disagree a little.
- 4. I agree a little.
- 5. I agree on the whole.
- 6. I agree very much.

VI-43 In this complicated world of ours the only way we can know what's going on is to rely on leaders or experts who can be trusted.

- 1. I disagree very much.
- 2. I disagree on the whole.
- 3. I disagree a little.
- 4. I agree a little.
- 5. I agree on the whole.
- 6. I agree very much.

VI-44 The present is all too often full of unhappiness. It is only the future that counts.

- 6. I agree very much.
- 5. I agree on the whole.
- 4. I agree a little.
- 3. I disagree a little.
- 2. I disagree on the whole.
- 1. I disagree very much.



VI-45 It is only when a person devotes himself to an ideal or cause that life becomes meaningful.

- 6. I agree very much.
- 5. I agree on the whole.
- 4. I agree a little.
- 3. I disagree a little.
- 2. I disagree on the whole.
- 1. I disagree very much.

VI-46 There are two kinds of people in this world: those who are for the truth and those who are against the truth.

- 1. I disagree very much.
- 2. I disagree on the whole.
- 3. I disagree a little.
- 4. I agree a little.
- 5. I agree on the whole.
- 6. I agree very much.

VI-47 Man on his own is a helpless and miserable creature.

- 1. I disagree very much.
- 2. I disagree on the whole.
- 3. I disagree a little.
- 4. I agree a little.
- 5. I agree on the whole.
- 6. I agree very much.

VI-48 It is only natural for a person to be rather fearful of the future.

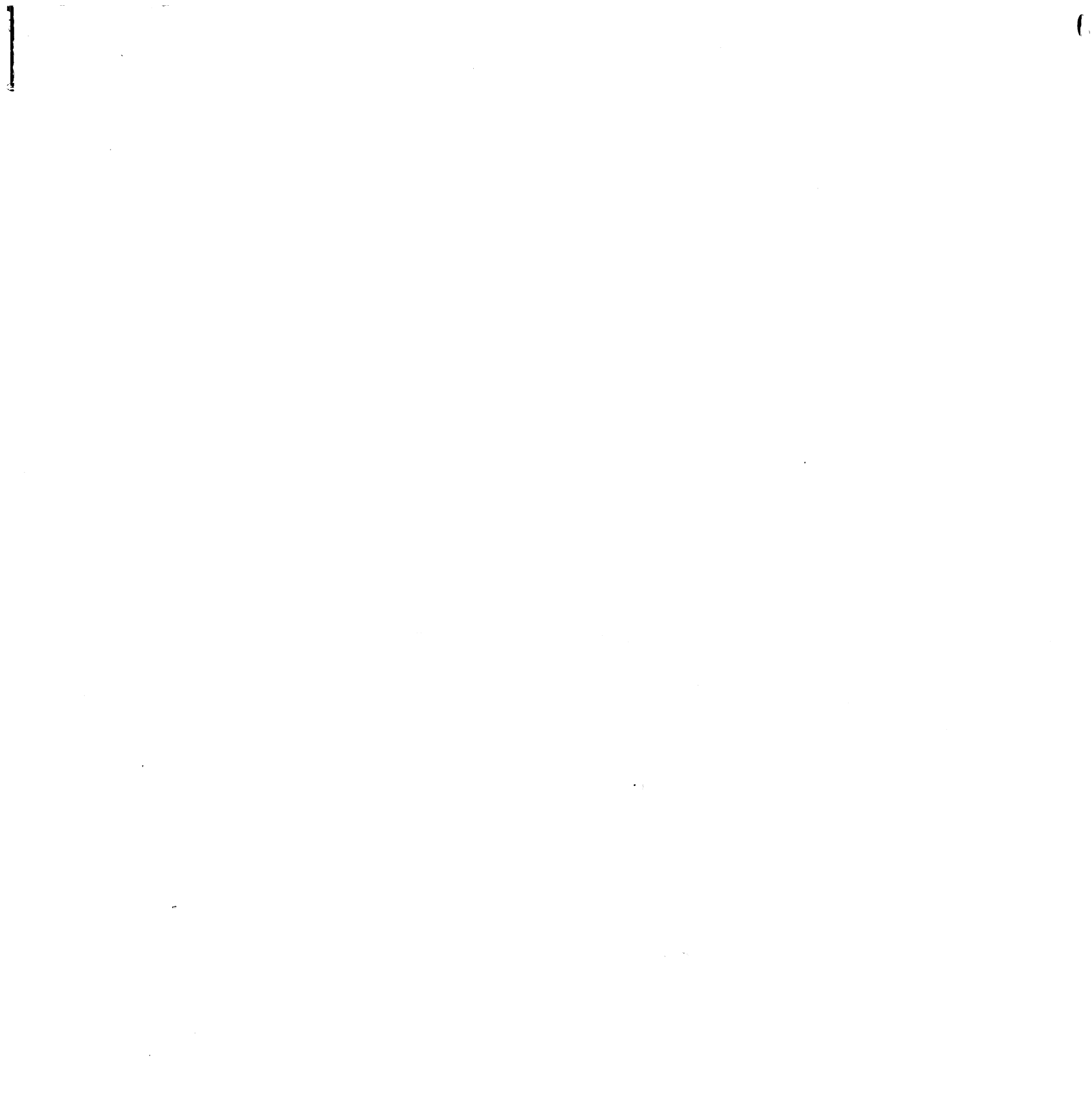
- 6. I agree very much.
- 5. I agree on the whole.
- 4. I agree a little.
- 3. I disagree a little.
- 2. I disagree on the whole.
- 1. I disagree very much.

VI-49 It is better to be a dead hero than a live coward.

- 6. I agree very much.
- 5. I agree on the whole.
- 4. I agree a little.
- 3. I disagree a little.
- 2. I disagree on the whole.
- 1. I disagree very much.

VI-50 The main thing in life is for a person to want to do something important.

- 1. I disagree very much.
- 2. I disagree on the whole.
- 3. I disagree a little.
- 4. I agree a little.
- 5. I agree on the whole.
- 6. I agree very much.



VI-51 If something grows up over a long time, there will always be much wisdom in it.

- 1. I disagree very much.
- 2. I disagree on the whole.
- 3. I disagree a little.
- 4. I agree a little.
- 5. I agree on the whole.
- 6. I agree very much.

VI-52 It bothers me when something unexpected interrupts my daily routine.

- 1. I disagree very much.
- 2. I disagree on the whole.
- 3. I disagree a little.
- 4. I agree a little.
- 5. I agree on the whole.
- 6. I agree very much.

VI-53 Young people would be a lot better off if they all received strict discipline from their parents.

- 6. I agree very much.
- 5. I agree on the whole.
- 4. I agree a little.
- 3. I disagree a little.
- 2. I disagree on the whole.
- 1. I disagree very much.

VI-54 A well-ordered way of life, with regular hours and an established routine, is best for my kind of temperament.

- 6. I agree very much.
- 5. I agree on the whole.
- 4. I agree a little.
- 3. I disagree a little.
- 2. I disagree on the whole.
- 1. I disagree very much.

VI-55 Bosses should say just what is to be done and exactly how to do it if they expect us to do a good job.

- 1. I disagree very much.
- 2. I disagree on the whole.
- 3. I disagree a little.
- 4. I agree a little.
- 5. I agree on the whole.
- 6. I agree very much.

VI-56 I am not, and never have been, the sort of person who would do something dangerous for the thrill of it.

- 6. I agree very much.
- 5. I agree on the whole.
- 4. I agree a little.
- 3. I disagree a little.
- 2. I disagree on the whole.
- 1. I disagree very much.

VI-57 Do things here at work ever make you feel "jumpy" or nervous?

- 1. Never.
- 2. Very seldom.
- 3. Seldom.
- 4. Sometimes.
- 5. Quite often.
- 6. Very often.

VI-58 When things get boring, I'm the sort of person who likes to stir up some excitement.

- 1. I agree very much.
- 2. I agree on the whole.
- 3. I agree a little.
- 4. I disagree a little.
- 5. I disagree on the whole.
- 6. I disagree very much.

VI-59 Frankly, most things that happen to me don't affect my feelings much one way or the other.

- 1. I agree very much.
- 2. I agree on the whole.
- 3. I agree a little.
- 4. I disagree a little.
- 5. I disagree on the whole.
- 6. I disagree very much.

VI-60 How hard do you usually have to work in order to get your work done?

- 1. I hardly ever get done, although I work very hard to do so.
- 2. I know I can hardly ever get done anyway, so I work at the pace that seems most comfortable for me.
- 3. I sometimes get done, but I have to work very hard to do so.
- 4. I sometimes get done, and I work at the pace that seems most comfortable for me.
- 5. I almost always get done, but I have to work very hard to do so.
- 6. I almost always get done, and I work at the pace that seems most comfortable for me.

The following questions are about the group of people you supervise.

SIV-67 About how many people are there in the group that you supervise directly?

- 1. 2
- 2. 3 - 5
- 3. 6 - 10
- 4. 11 - 15
- 5. More than 15

SIV-68 Do you feel that you are really a part of the work group you supervise?

- 1. I'm really a part of this group.
- 2. I'm included in most ways.
- 3. I'm included in some ways, but not in others.
- 4. I don't feel I really belong.

SIV-69 If you had a chance to be a supervisor for the same pay in another work group, how would you feel about moving?

- 1. I would want very much to move.
- 2. I would rather move than stay where I am.
- 3. It would make no difference to me.
- 4. I would rather stay where I am than move.
- 5. I would want very much to stay where I am.

How does the work group you supervise compare with other work groups in this company on each of the following points?

SIV-70 The way members get along together 1. ___ Better than most 2. ___ About the same as most 3. ___ Not as well as most

SIV-71 The way members stick together 1. ___ Better than most 2. ___ About the same as most 3. ___ Not as well as most

SIV-72 The way members help each other on the job 1. ___ Better than most 2. ___ About the same as most 3. ___ Not as well as most

SIV 74 - I feel closer to the people I supervise than to the people who supervise me.

- 1. I agree very much.
- 2. I agree somewhat.
- 3. I agree a little.
- 4. I disagree a little.
- 5. I disagree somewhat.
- 6. I disagree very much.

S-V-73 All things considered, how easy would it be for [REDACTED]
to find someone else to do the job you are now doing?

- 1. Very difficult
- 2. Fairly difficult
- 3. A little bit difficult
- 4. Fairly easy
- 5. Very easy
- 6. Don't know

V-75 As far as you can tell, what do your supervisors think about your work performance here at [REDACTED]?

- 1. They like it very much.
- 2. They like it.
- 3. They like most things about it, but there are some exceptions.
- 4. There are several things about my work performance that they don't like.
- 5. There are many things about my work performance that they don't like.
- 9. Don't know.

V-76 How qualified do you feel you are to handle different jobs in this company?

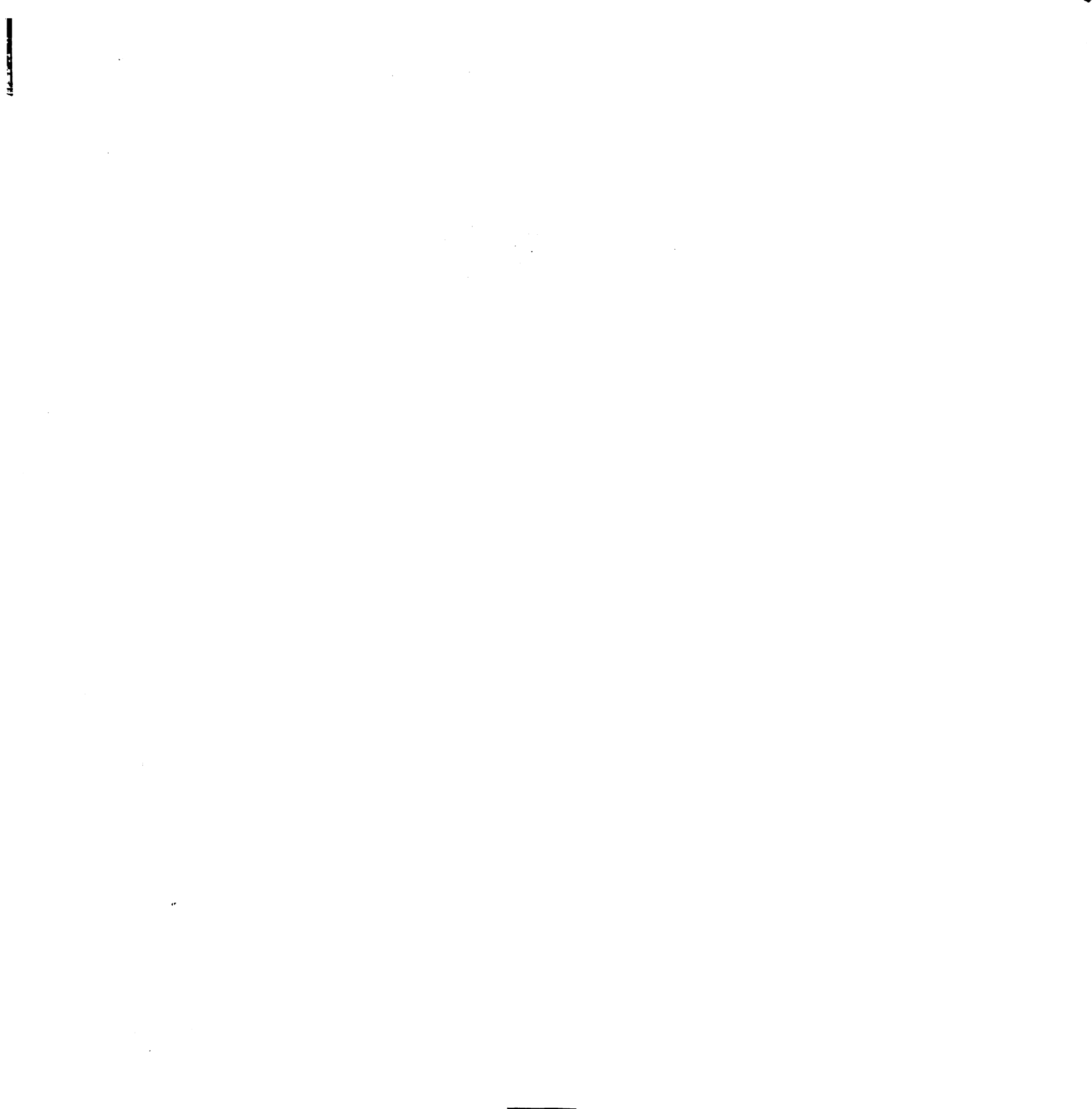
- 1. Much more than most employees.
- 2. More than most employees.
- 3. About the same as most employees.
- 4. Less than most employees.
- 5. Much less than most employees.

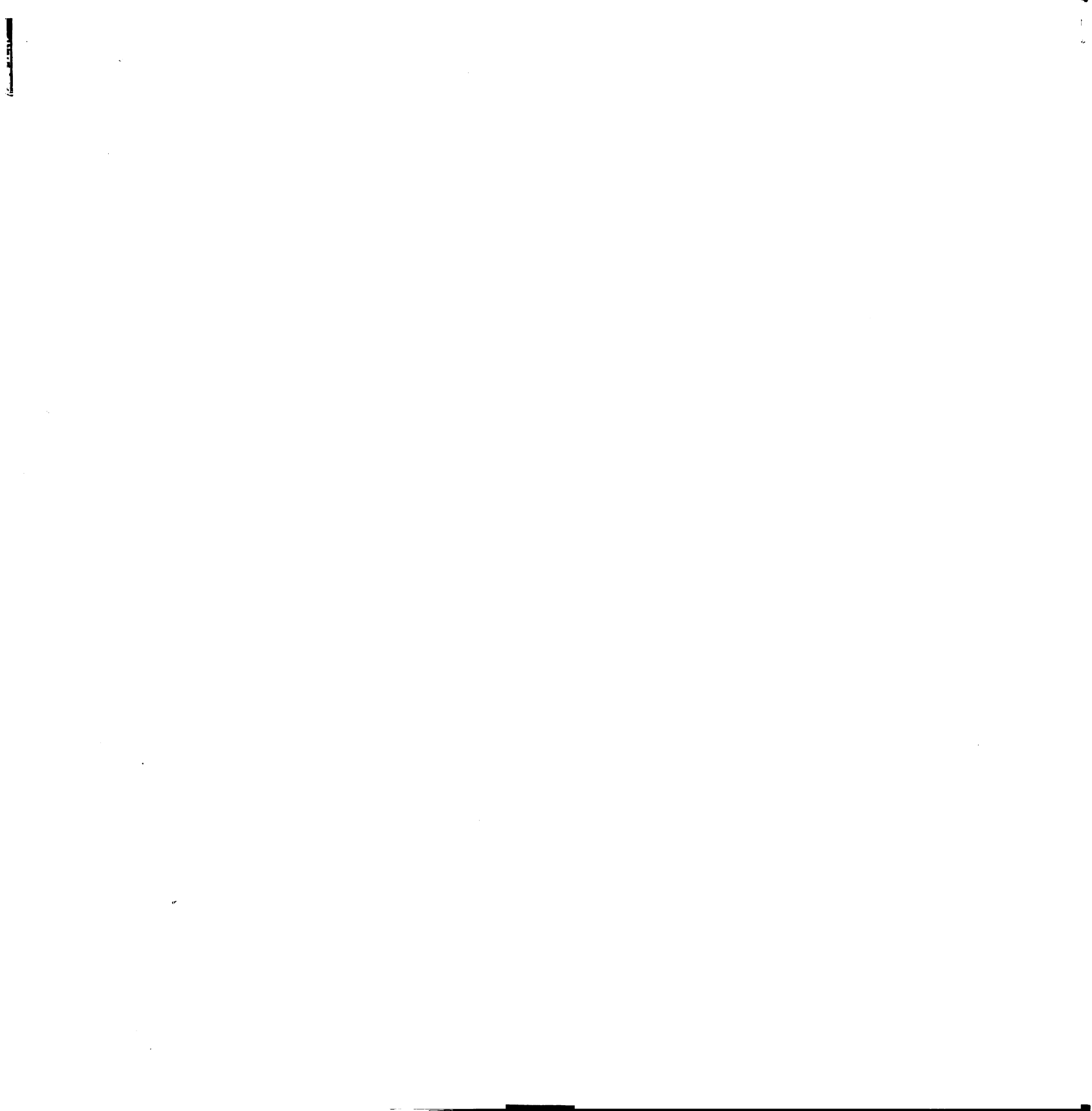
V-77 Considering what you want in a job, how do the other jobs for which you are qualified compare with your present job?

- 1. All are better than my present job.
- 2. Most are better but a few are worse than my present job.
- 3. Some are better and some are worse than my present job.
- 4. A few are better but most are worse than my present job.
- 5. All are worse than my present job.

The check list on the next page gives you an opportunity to express how you feel about certain aspects of your job. Consider the first aspect listed in the column to the left. Place a check mark under the statement in Column A which best describes how satisfied you are with this aspect of your job. Then decide whether you want an increase in this aspect of your job, a decrease in it, or no change in it, and place a check mark under the appropriate statement in Column B. Then go on to the next aspect.

Example: Suppose the job aspect had to do with the amount of illumination on your job. If you felt "somewhat satisfied" with the amount of illumination and if you wanted a decrease in illumination (to reduce glare), you should put one check mark under "somewhat satisfied" in Column A and one check mark under "a decrease" in Column B.





X-36 How satisfied are you with the way changes are handled around here?

1. Completely satisfied
 2. Very satisfied
 3. Quite satisfied
 4. Somewhat satisfied
 5. Not satisfied

X-37 How satisfied are you with the kind of work you do?

1. Completely satisfied
 2. Very satisfied
 3. Quite satisfied
 4. Somewhat satisfied
 5. Not satisfied

X-38 How satisfied are you with the company you work for?

1. Completely satisfied
 2. Very satisfied
 3. Quite satisfied
 4. Somewhat satisfied
 5. Not satisfied

X-39 Taking everything into account, how satisfied are you with your job?

1. Completely satisfied
 2. Very satisfied
 3. Quite satisfied
 4. Somewhat satisfied
 5. Not satisfied

IV-67 Why are you working? _____

IV-68 If you received a large inheritance or a large sum of money from some source, would you still work?

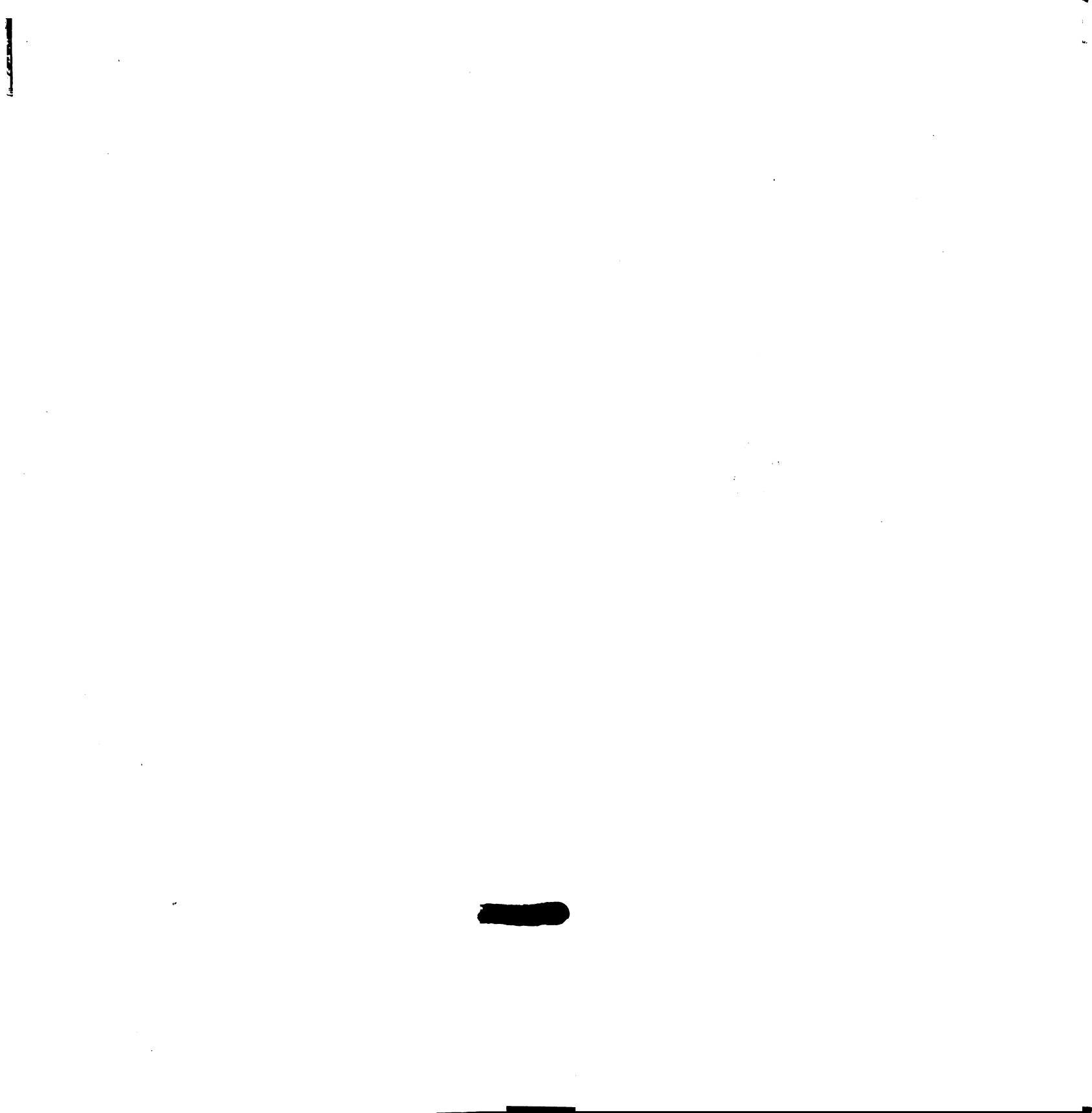
Yes _____ No _____

Why? _____

IV-69 If you received a large inheritance or a large sum of money from some source, would you still work at _____?

Yes _____ No _____

Why? _____



SX-35 How easy would it be for you to get a job as good as the one you now have at some other company?

- 1. Very easy
- 2. Fairly easy
- 3. A little bit difficult
- 4. Fairly difficult
- 5. Very difficult
- 6. I don't know

SX-34 How many supervisors in the company think that your job is more desirable than their own jobs?

- 1. Almost all
- 2. Many
- 3. Some
- 4. Few
- 5. Almost none

SX-33 What do you expect to be doing five years from now?

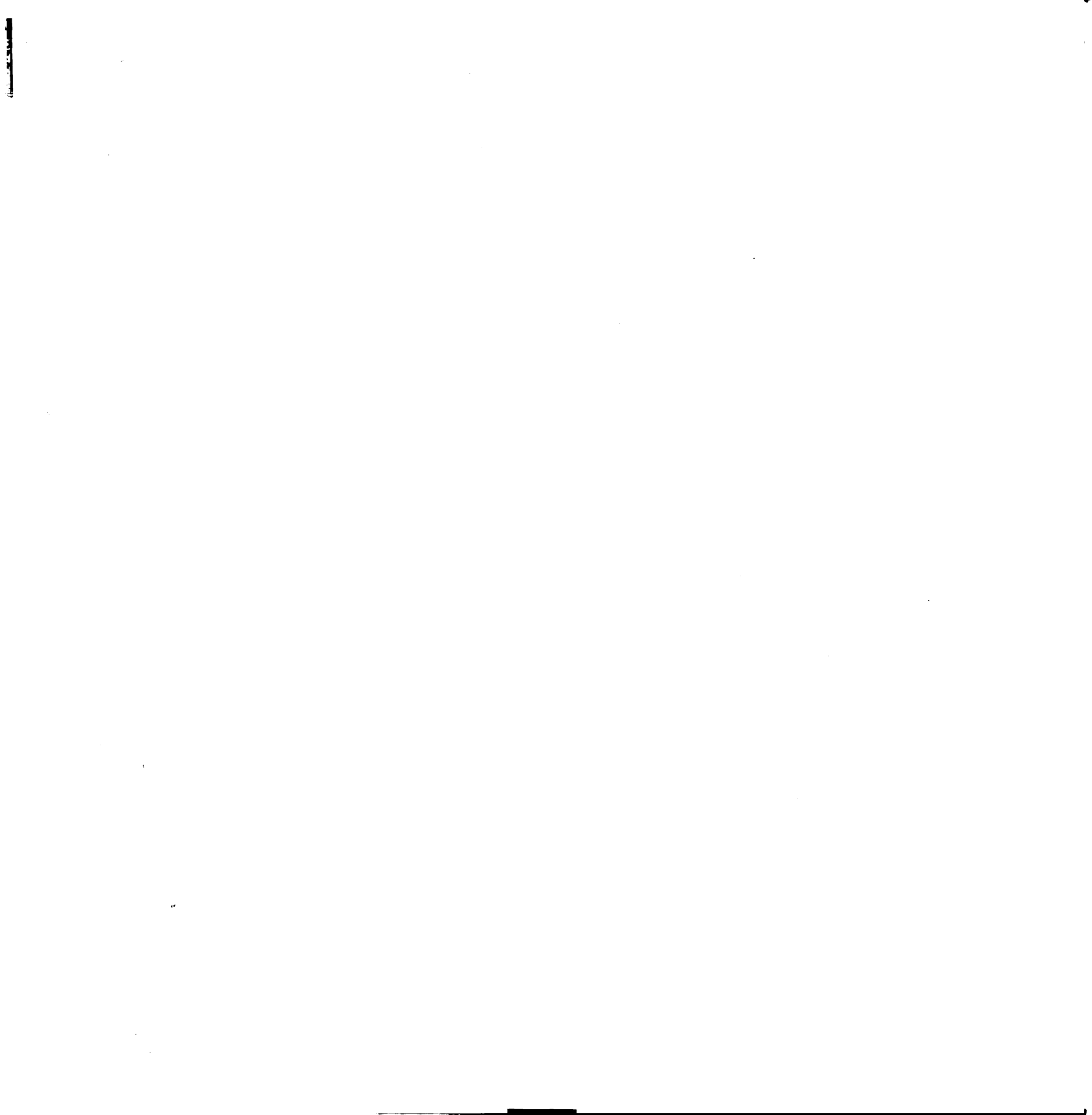
- 2. Working at the same job in this company
- 3. Working at a better job in this company
- 4. Being a supervisor in some other company
- 5. Working at a nonsupervisory job elsewhere
- 6. Running own business
- 7. Being a housewife
- 8. Retired
- 9. Other _____
- 0. Don't know

S IV-70 Are you now taking any special training?

- 1. No, and I don't really plan to
- 2. No, and I don't know whether I will or not
- 3. No, but I plan to within 5 years
- 4. Yes, training to help me on the job I'm on now
- 5. Yes, training for a different job in this company
- 6. Yes, training for a job elsewhere
- 7. Yes, training to help me enter a profession or start my own business

SX-32 What do you think the possibilities are of your getting a promotion in the next year?

- 1. Very likely
- 2. Fairly likely
- 3. Likely in some ways, not in others
- 4. Unlikely
- 5. Very unlikely



X-17 How many years have you worked since leaving school?

- 1. Less than 1 year
- 2. 1 - 2 years
- 3. 3 - 5 years
- 4. 6 - 10 years
- 5. 11 or more years

X-18 How many more years do you expect to work?

- 1. Less than 1 year
- 2. 1 - 2 years
- 3. 3 - 5 years
- 4. 6 - 10 years
- 5. 11 or more years
- 9. I don't know

- X-12 When were you hired by _____? Year _____ Month _____
- X-11,11 What is your present job title? (example: department head)

- X-13 When did you start on your present job? Year _____ Month _____
- X-4,5, What is your section and department? _____
- X-14 Within the past 6 months have you tried to transfer from your present job to another job or department within the company? Yes _____ No _____
- X-15 Within the past 6 months have you registered with any employment agency or applied for a job with any other organization? Yes _____ No _____
- X-23 Are you the only wage earner in your household? Yes _____ No _____
- X-24 Are you the main wage earner in your household? Yes _____ No _____
- X-25 Could your household live adequately if you were not working? Yes _____ No _____
- X-26 Is your household living adequately now? Yes _____ No _____
- X-27 What is your present salary before taxes and other deductions? _____ dollars
Check whether this is per month _____, week _____, or 2 weeks _____.
- X-9 Date of birth: Month _____ Day _____ Year _____
- X-6 Sex: Male _____ Female _____
- X-7 Marital status: Single _____ Married _____ Divorced _____
Separated _____
Widowed _____
- X-8 How many years of school have you completed? Circle highest grade completed.
- | | | | | | | | | |
|---|---|---|----|----|----|-----------------|---------|------------------|
| 7 | 8 | 9 | 10 | 11 | 12 | Some
College | College | Graduate
Work |
|---|---|---|----|----|----|-----------------|---------|------------------|

[REDACTED]

X-19 Have you spent most of your life in a

- 1. farm area
- 2. small town
- 3. city

X-20 What is (was) your father's occupation? (examples: farmer, machinist, doctor) _____

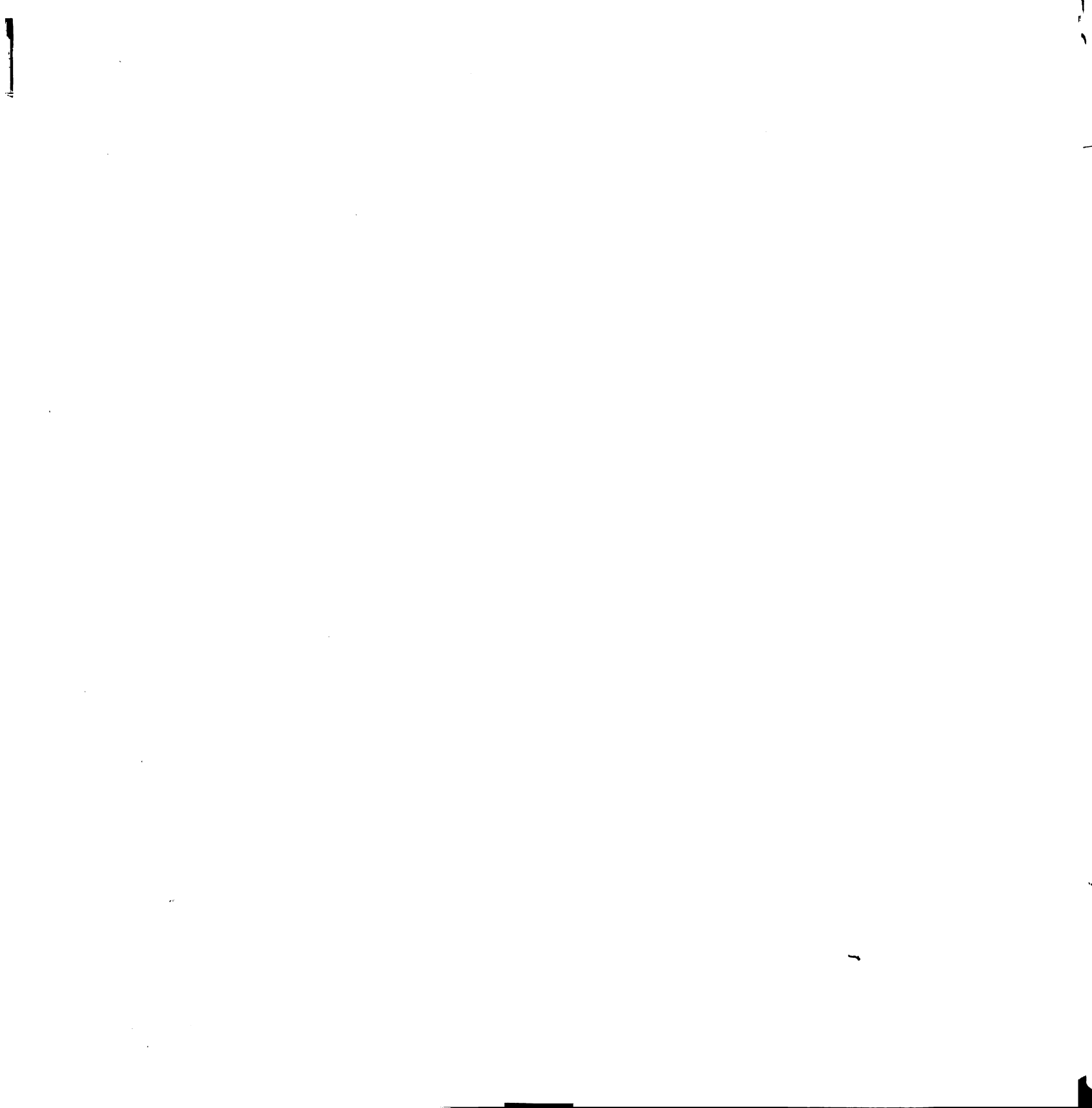
X-21 What is (was) your father's annual income?

- 1. less than 3000 dollars
- 2. 3000 - 7000 dollars
- 3. 7000 - 15,000 dollars
- 4. over 15,000 dollars

X-22 In your community do you consider yourself a member of the

- 1. upper class
- 2. upper middle class
- 3. middle class
- 4. lower middle class
- 5. working class
- 6. lower class

Thank you for your cooperation. Now tear off the ballot at the bottom of the cover page of the questionnaire. Place the ballot in the "Ballot Box" and place the questionnaire in the box marked "Questionnaires".



MICHIGAN STATE UNIVERSITY

OF AGRICULTURE AND APPLIED SCIENCE • EAST LANSING

LABOR AND INDUSTRIAL RELATIONS CENTER

Project OE 112-E-4

194

November 1957

To: Employees of [REDACTED] Insurance Company

The Labor and Industrial Relations Center at Michigan State University is carrying on a broad program of research having to do with people working together effectively in industrial organizations. Much of the research consists of getting the ideas and opinions of people about their jobs.

You are being asked to fill out a questionnaire as a part of this series of studies. Your answers, along with those from people in other organizations, will be analyzed to help discover what things are most important in making the working situation better for the people in it.

The value of this study depends upon the sincerity and care with which you answer the questions. It is important to get your real feelings. We are looking for frank statements about your attitudes, feelings, opinions and judgments about certain aspects of your job.

The answers that you give will be made available only to the research team in the Labor and Industrial Relations Center. No one connected in any way with your organization will see or use any of the individual questionnaires or be able in any way to find out what kind of answers you have given. Your information will be held in the strictest confidence and the results of the study will be tabulated on a group basis only.

Reports on the general findings from the study will be prepared for you, the company and the general public.

Einar Hardin
Research Associate
Labor and Industrial Relations Center
Michigan State University

Please print your name below. When you have finished the questionnaire, tear this part off and place it in the "ballot box" by the door. THIS INFORMATION WILL BE USED TO HELP US ANALYZE THE QUESTIONNAIRE. IT WILL NOT BE AVAILABLE TO ANYONE IN THE COMPANY.

Name _____

194

[REDACTED]

GO THROUGH THESE QUESTIONS QUICKLY. CHOOSE THE ONE ANSWER THAT COMES CLOSEST TO THE WAY THAT YOU FEEL. PLACE A CHECK MARK (✓) IN THE SPACE IN FRONT OF YOUR CHOICE. PLEASE TRY TO ANSWER EVERY QUESTION.

I-40 Check the one statement that best describes the rate at which changes are taking place in the world today.

- 1. Much more rapidly than before.
- 2. Somewhat more rapidly than before.
- 3. At about the same rate as before.
- 4. Somewhat less rapidly than before.
- 5. Much less rapidly than before.
- 9. Don't know.

I-41 How do you feel about this?

- 1. I like it very much.
- 2. I like it.
- 3. It makes no difference to me.
- 4. I dislike it.
- 5. I dislike it very much.

I-42 In general, new developments in machines and processes for handling work:

- 1. Benefit all of the people.
- 2. Benefit most of the people.
- 3. Benefit some of the people.
- 4. Benefit only a few people.
- 5. Benefit only a very few people.
- 9. Don't know.

I-43 At what rate do you feel new developments in machines and methods for doing work are taking place?

- 1. Much less rapidly than is desirable.
- 2. Somewhat less rapidly than is desirable.
- 3. At about the ideal rate.
- 4. Somewhat more rapidly than is desirable.
- 5. Much more rapidly than is desirable.
- 9. Don't know.

I-44 Have new machines changed the tasks performed on your kind of job in the past year?

- 1. Yes, to a very large extent.
- 2. Yes, to a rather large extent.
- 3. Yes, to a moderate extent.
- 4. Yes, to a slight extent.
- 5. No, not at all.
- 9. Don't know.

I-45 How do you feel about this?

- 1. I like it very much.
- 2. I like it.
- 3. It makes no difference to me.
- 4. I dislike it.
- 5. I dislike it very much.

I-46 Have machines caused employees in insurance companies to transfer to different jobs within the company in the past year?

- 1. Yes, to a very large extent.
- 2. Yes, to a large extent.
- 3. Yes, to a moderate extent.
- 4. Yes, to a slight extent.
- 5. No, not at all.
- 9. Don't know.

I-47 How do you feel about this?

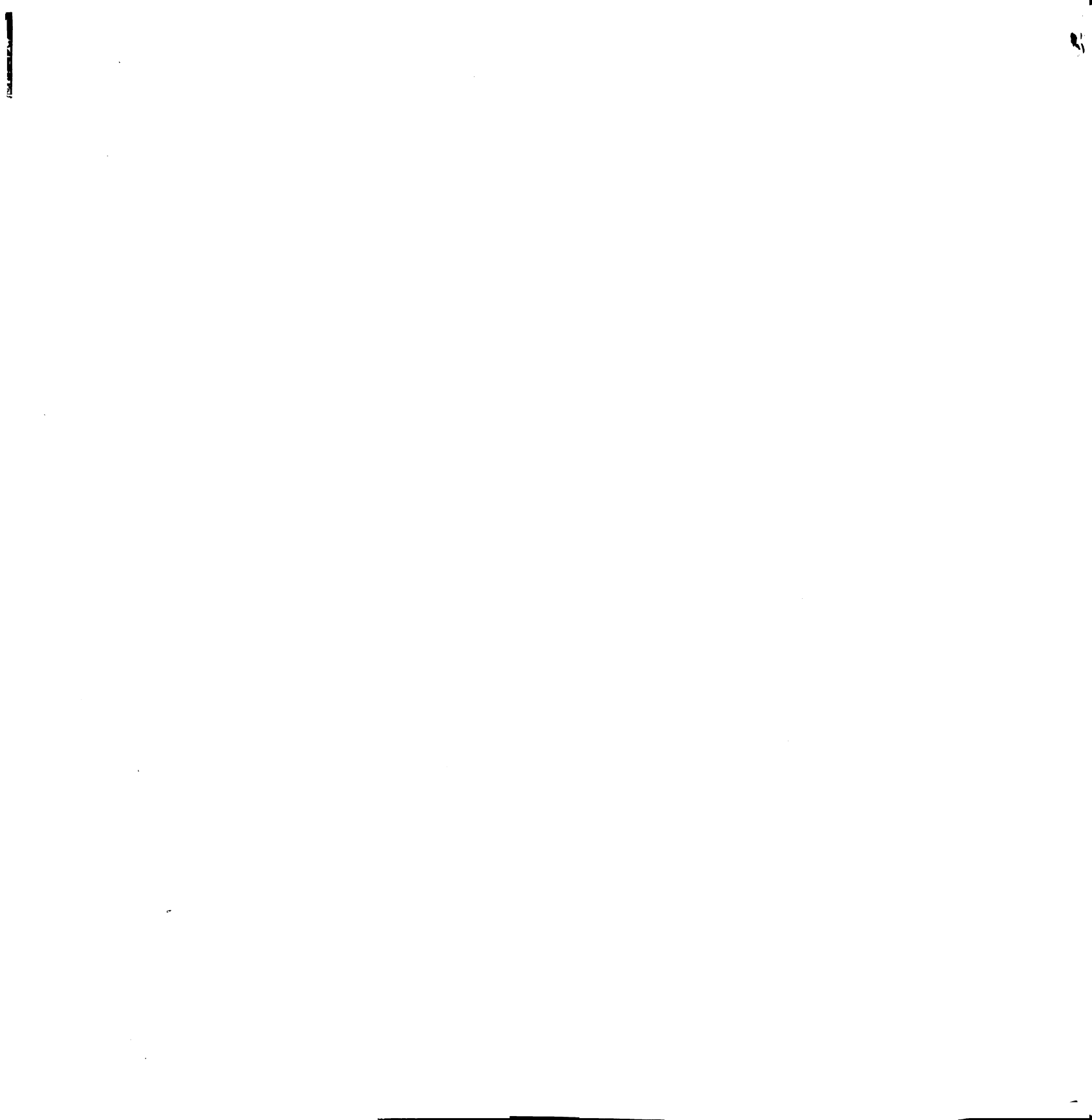
- 1. I like it very much.
- 2. I like it.
- 3. It makes no difference to me.
- 4. I dislike it.
- 5. I dislike it very much.

I-48 Have machines caused employees to lose their jobs in insurance companies in the past year?

- 1. Yes, to a very large extent.
- 2. Yes, to a large extent.
- 3. Yes, to a moderate extent.
- 4. Yes, to a slight extent.
- 5. No, not at all.
- 9. Don't know.

I-49 How do you feel about this?

- 1. I like it very much.
- 2. I like it.
- 3. It makes no difference to me.
- 4. I dislike it.
- 5. I dislike it very much.



I-50 Are the chances that a machine will cause you to do different work on your job greater or less than for most jobs in this company?

- 1. Much greater than for most jobs.
- 2. Somewhat greater than for most jobs.
- 3. Greater than some, less than others.
- 4. Somewhat less than for most jobs.
- 5. Much less than for most jobs.
- 9. Don't know.

I-51 How do you feel about this?

- 1. I like it very much.
- 2. I like it.
- 3. It makes no difference to me.
- 4. I dislike it.
- 5. I dislike it very much.

I-52 In your company, have employees lost their jobs because of machines in the past year?

- 1. Yes, to a very large extent.
- 2. Yes, to a large extent.
- 3. Yes, to a moderate extent.
- 4. Yes, to a slight extent.
- 5. No, not at all.
- 9. Don't know.

I-53 How do you feel about this?

- 5. I dislike it very much.
- 4. I dislike it.
- 3. It makes no difference to me.
- 2. I like it.
- 1. I like it very much.

I-54 What will happen to the total number of people doing your kind of job in insurance companies in the next five years?

- 1. Greatly increase.
- 2. Slightly increase.
- 3. Remain about the same.
- 4. Slightly decrease.
- 5. Greatly decrease.
- 9. Don't know.

I-55 How do you feel about this?

- 5. I dislike it very much.
- 4. I dislike it.
- 3. It makes no difference to me.
- 2. I like it.
- 1. I like it very much.

I-56 The job that you would consider ideal for you would be one where the way you do your work:

- 5. Is always the same.
- 4. Changes very little.
- 3. Changes somewhat.
- 2. Changes quite a bit.
- 1. Changes a great deal.

I-57 On the job that you have now, how much of your present work involves the use of office machines?

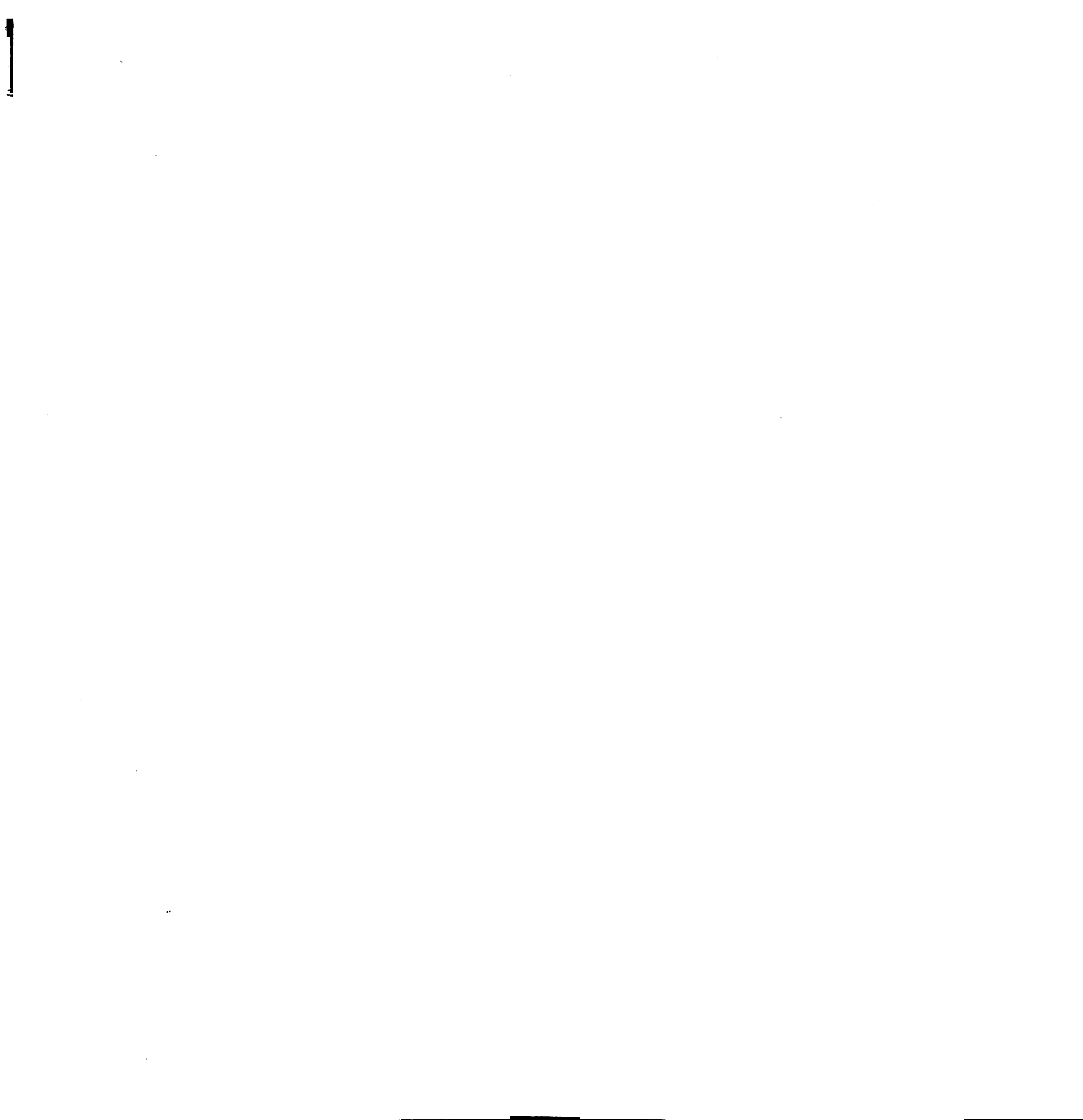
- 1. Almost all of it.
- 2. A large part of it.
- 3. Some of it.
- 4. A small part of it.
- 5. Almost none of it.
- 9. Don't know.

I-58 On the job that would be ideal for you, how much of your work would involve the use of office machines?

- 1. Almost all of it.
- 2. A large part of it.
- 3. Some of it.
- 4. A small part of it.
- 5. Almost none of it.
- 9. Don't know.

I-59 Do you feel that your kind of job will require more or less use of machines by 1960?

- 1. Much more use of machines.
- 2. Somewhat more use of machines.
- 3. A little more use of machines.
- 4. No more use of machines than now.
- 5. A little less use of machines.
- 9. Don't know.

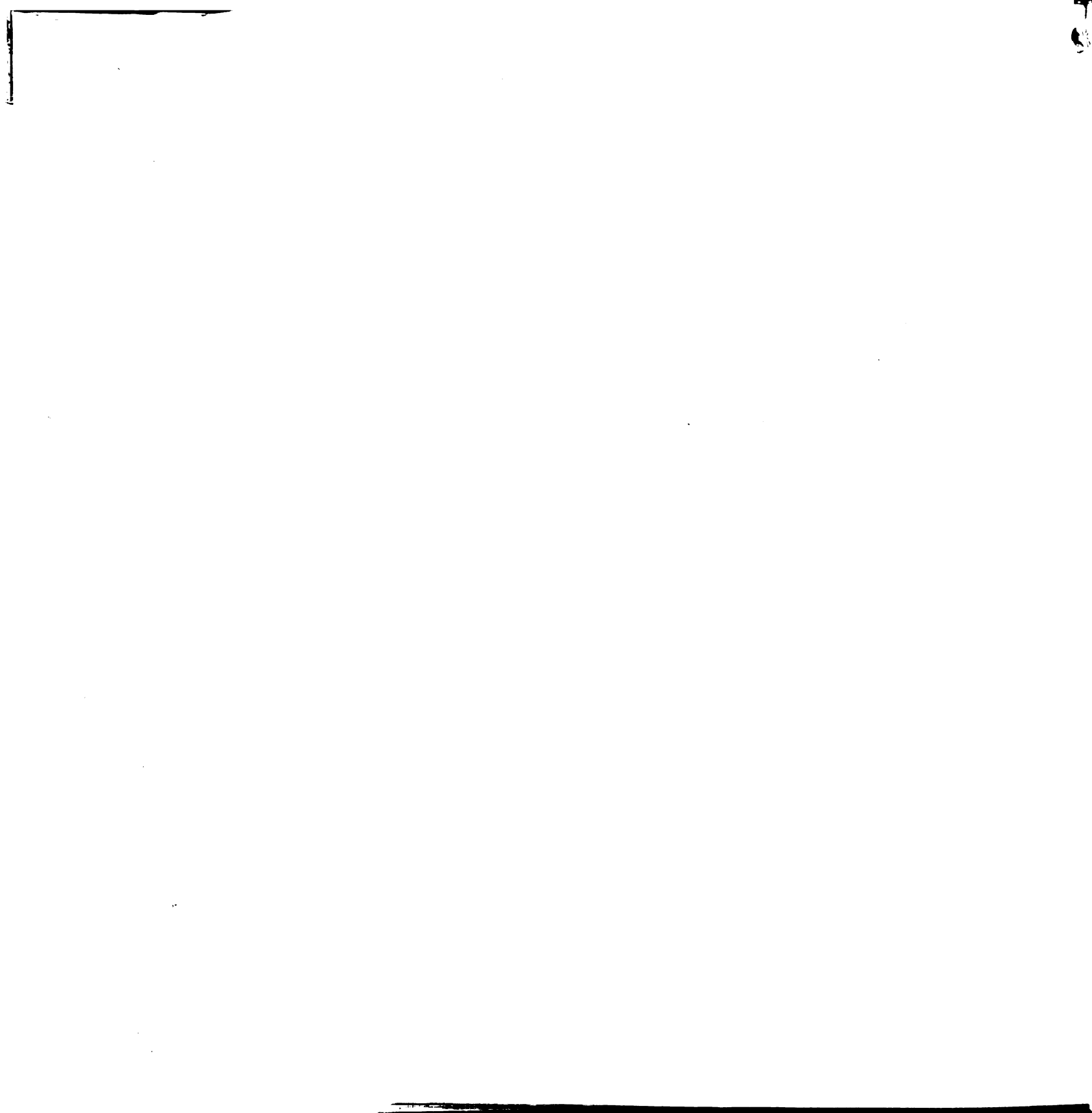


I-60 In general, how much change takes place from time to time in the way you are expected to do your present job?

- 1. Much more change than for most jobs.
- 2. Somewhat more change than for most jobs.
- 3. About the same amount of change as for most jobs.
- 4. Somewhat less change than for most jobs.
- 5. A lot less change than for most jobs.

I-61 How do you feel about this?

- 5. I dislike it very much.
- 4. I dislike it.
- 3. It makes no difference to me.
- 2. I like it.
- 1. I like it very much.



On the next page you will find a list of statements about aspects of your job. You are asked to answer two questions about each aspect of your job. "Has this aspect of your job changed in the past six months?" (Question "A"), and "How do you feel about the change (or lack of change) in this aspect of your job?" (Question "B")

1. If you had the same job title here at [redacted] six months ago, compare the way your job is now with the way it was six months ago on each of the job aspects.

2. If you had a different job here at [redacted] six months ago, compare your present job with the job you had six months ago on each of the job aspects.

3. If you have not been with [redacted] for at least six months, indicate any changes which have occurred in the aspects of your job since you came to [redacted].

Example: Suppose the statement had to do with hours of work. If you are working more hours now ("A") and don't like it ("B"), you would check the spaces like this:

QUESTION "A"					QUESTION "B"				
How has this aspect of your job changed in the past six months?					How do you feel about this change (or lack of change) in your job?				
much more now	more now	no change	less now	much less now	like a lot		don't care	dis-like	

The hours
I work on
this job....

_____ ✓ _____ _____ _____ _____ ✓ _____

QUESTION "A"

QUESTION "B"

How has this aspect of your job changed in the past six months?

How do you feel about this change (or lack of change) in your job?

ANSWER QUESTIONS "A" AND "B" FOR EACH OF THESE STATEMENTS

much more no less much
more now change now less
now

like like don't dis- dislike
it a it care like it a
lot

I-62 1. The amount of variety in my work.....

I-63 2. The amount of work required on my job.....

I-64 3. The degree of accuracy demanded by my job.....

I-65 4. My control over the pace of my work.....

I-66 5. The importance of my job for the company.....

I-67 6. The amount of supervision I get on my job.....

I-68 7. The amount of skill needed on my job.....

I-69 8. The amount of responsibility demanded by my job.....

I-70 9. The amount of planning I have to do on my job.....

I-71 10. The amount of judgment I have to use on my job.....

I-72 11. The degree to which my work is interesting.....

I-73 12. The amount of security I feel on my job.....

I-74 13. My chances for promotion to a better job.....

I-75 14. The amount of pay I get on my job.....

The following questions are concerned with the contacts you have with other people in your work, and with how you feel about the information you receive regarding changes in your job.

II-40 During a regular workday I generally exchange information connected with my work with the following number of people:

- 1. None
- 2. 1 - 2
- 3. 3 - 5
- 4. 6 - 10
- 5. More than 10

II-41 My job requires me to give information to my supervisor:

- 1. Very frequently
- 2. Often
- 3. Sometimes
- 4. Seldom
- 5. Very infrequently

II-42 When there is some gossip or information in the "grape-vine":

- 1. I am always the first one to hear about it.
- 2. I am usually one of the first to hear about it.
- 3. I hear about it at about the same time as everyone else does.
- 4. I am usually one of the last to hear about it.
- 5. I never hear about it.

II-43 How satisfied are you with the information you receive concerning changes in the company and in your job?

- 1. Completely satisfied
- 2. Very satisfied
- 3. Quite satisfied
- 4. Somewhat satisfied
- 5. Not satisfied

II-44 How satisfied are you with the number of opportunities you have to discuss things about your job with your fellow employees?

- 1. Completely satisfied
- 2. Very satisfied
- 3. Quite satisfied
- 4. Somewhat satisfied
- 5. Not satisfied

II-45 How satisfied are you with the number of opportunities you have to discuss things about your job with your supervisor?

- 1. Completely satisfied
- 2. Very satisfied
- 3. Quite satisfied
- 4. Somewhat satisfied
- 5. Not satisfied

II-46 How much information has the company given the employees this fall?

- 1. Much more than usual.
- 2. More than usual.
- 3. About the same as usual.
- 4. Less than usual.
- 5. Much less than usual.

In the right-hand column next to each item place a check mark under the statement which best describes your satisfaction with information received from the company.

ASPECTS OF INFORMATION	Satisfaction				
	Completely satisfied	Very satisfied	Quite satisfied	Somewhat satisfied	Not satisfied
1. Amount of information.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Accuracy of information.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Understandability of information.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Getting information soon enough.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

As you may know, your company is planning to install an IBM "650" Computer in December. We are interested in how you think this machine may affect your job here at [REDACTED]. The following questions ask for your opinions as to what the effects may be.

II - 51 Which statement best describes the effect you expect the computer to have on you in the next six months?

- 1. I expect to be promoted.
- 2. I expect to be transferred to a different job.
- 3. I expect to keep the same job, but with the work greatly changed.
- 4. I expect to keep the same job, but with the work noticeably changed.
- 5. I expect to keep the same job with the work only slightly changed.
- 6. I expect to keep the same job with no change at all.
- 7. I don't expect to be affected for I plan to quit working soon.
- 8. Other (describe) _____
- 9. I have no idea.

II - 52 How do you feel about this?

- 1. I like it very much.
- 2. I like it.
- 3. It makes no difference to me.
- 4. I dislike it.
- 5. I dislike it very much.

II - 53 Do you think that the computer will influence your job in the next year or two?

- 1. It is very likely.
- 2. It is quite likely.
- 3. It is possible, but not very likely.
- 4. It is not very likely.
- 5. It is not at all likely.
- 6. I have no idea.

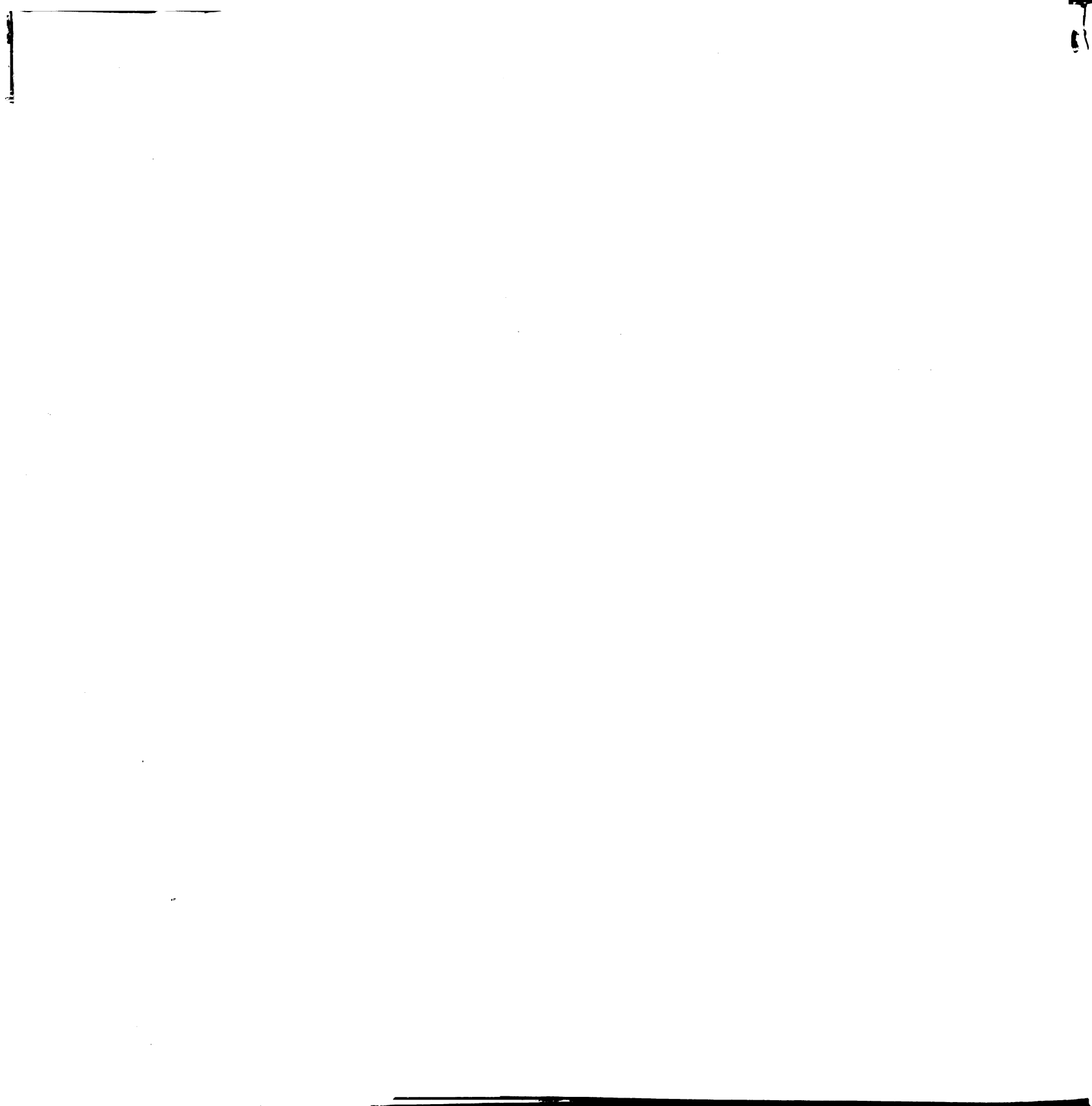
II - 54 How do you feel about this?

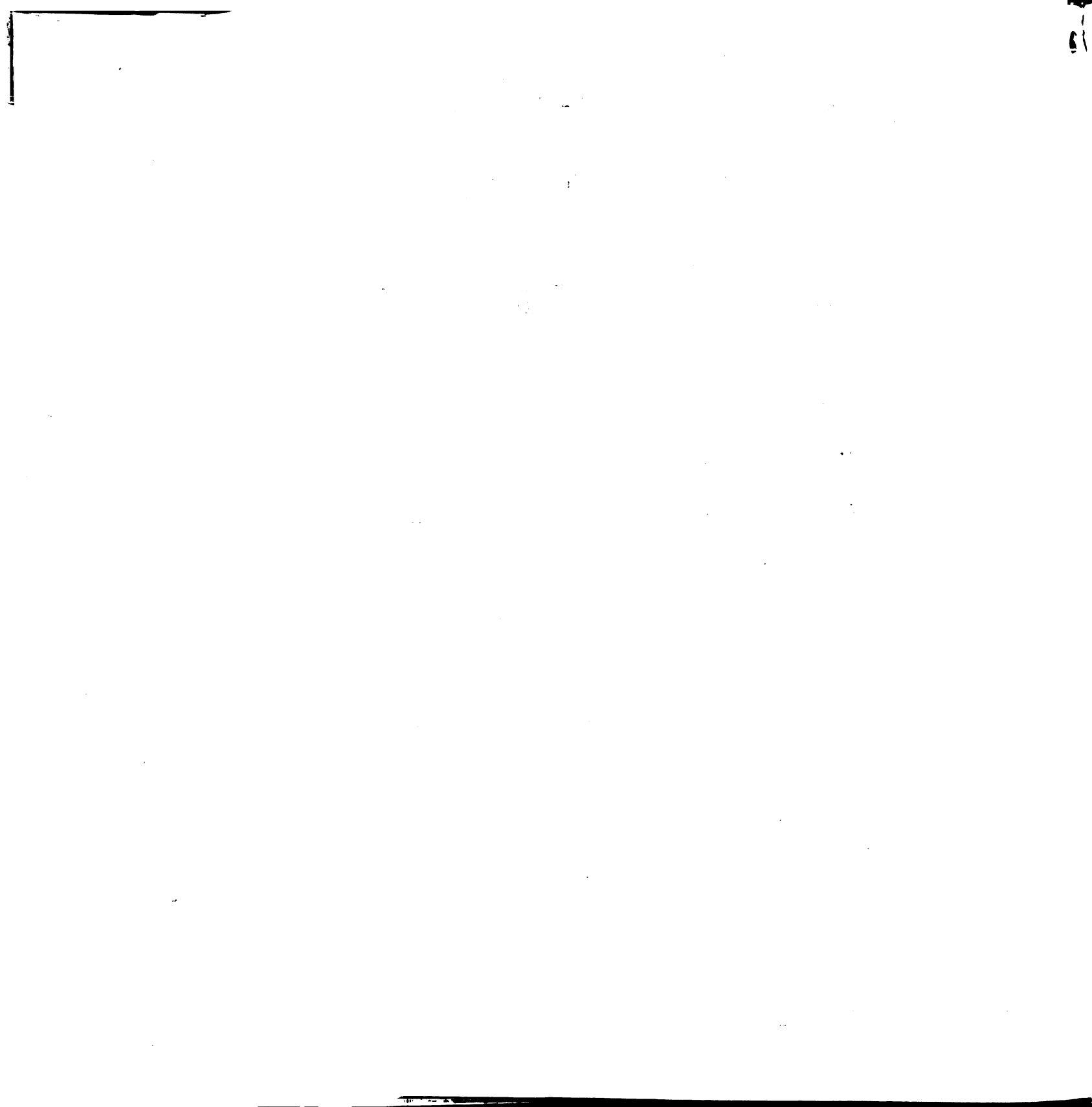
- 1. I like it very much.
- 2. I like it.
- 3. It makes no difference to me.
- 4. I dislike it.
- 5. I dislike it very much.

II-55 What is your general feeling about the fact that the company has decided to install the computer?

- 1. I like it very much.
- 2. I like it.
- 3. It makes no difference to me.
- 4. I dislike it.
- 5. I dislike it very much.

II-56 Why do you feel this way? _____





The following items deal with company information about the IBM "650":

III-40 I can recall first hearing that the company was installing an IBM "650" computer:

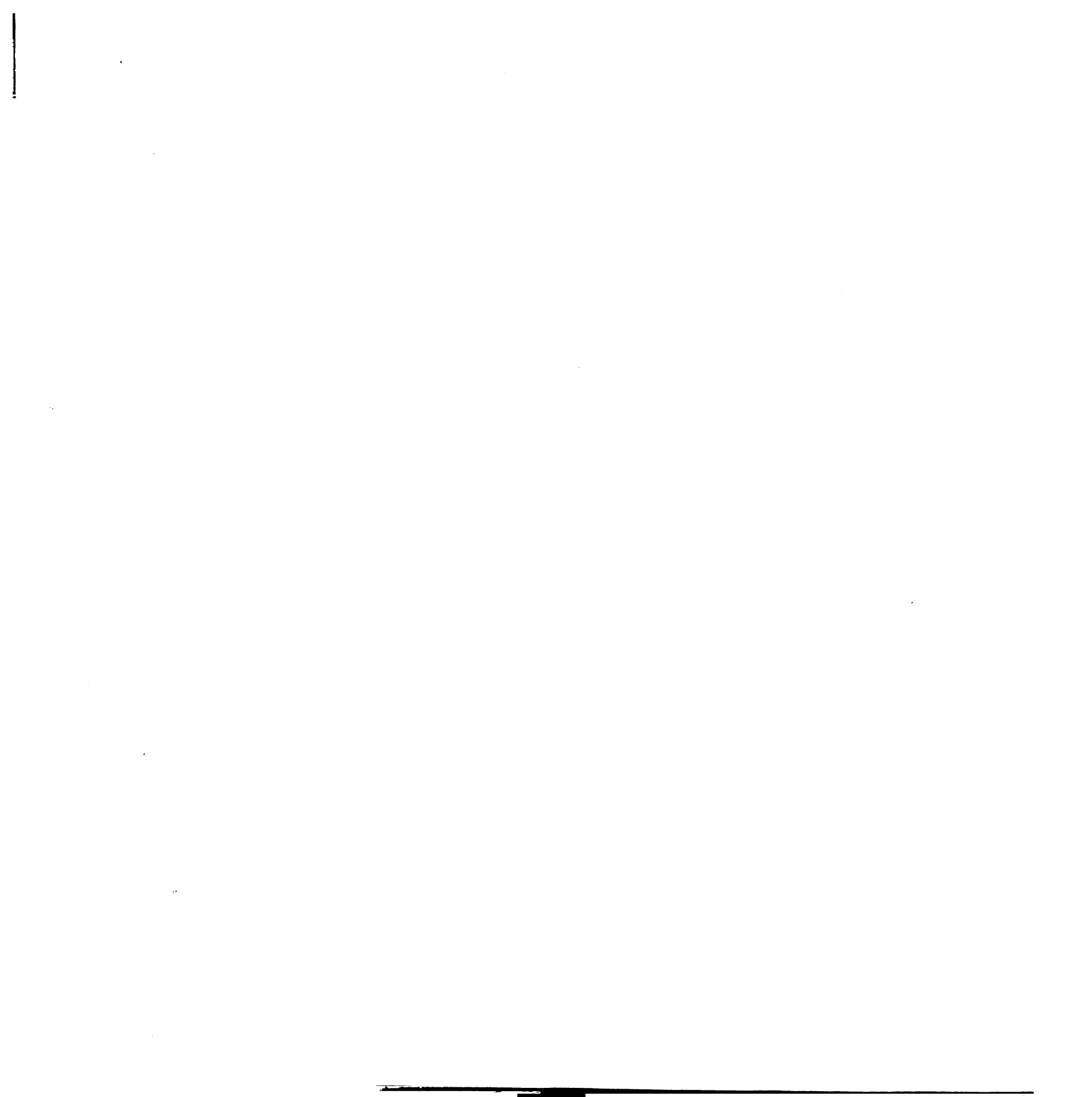
- 1. More than a year ago
- 2. Between six months and one year ago
- 3. Several months ago
- 4. A few weeks ago
- 5. A few days ago
- 6. I didn't know until today that a computer was to be installed.

III-41 Of the information distributed about the IBM "650" computer prior to its installation I think I have received:

- 1. All of it
- 2. Most of it
- 3. Some of it
- 4. Only a little of it
- 5. None of it

III-42 I have discussed the IBM "650" computer with others:

- 1. Very often
- 2. Often
- 3. Sometimes
- 4. Not often
- 5. Never



The company has made various statements and announcements in connection with the preparations for the computer. Some have been made in [REDACTED], some have been made in special bulletins, and some may have been made in information meetings or by your direct supervisor. We are interested in finding out how well the information has reached you. In the table below there is a series of statements. For each of the statements indicate, to the best of your knowledge, whether the company has: (A) made any statement with that meaning, (B) made any statement with the opposite meaning, or (C) not said anything about the subject.

STATEMENT	The company has:		
	<u>A</u> Said so	<u>B</u> Said the opposite	<u>C</u> Said nothing about the subject
III-44 The computer will not make any mistakes of its own.....	—	—	—
III-45 The computer cannot correct errors that exist in the data it receives.....	—	—	—
III-46 The IBM 650 programmer will spend a lot of time preparing coded instructions for the machine.....	—	—	—
III-47 Most of the time the computer will be operated by the IBM 650 programmer.....	—	—	—
III-48 One of the immediate tasks of the IBM 650 programmer is to develop a procedure for figuring payroll on the computer.....	—	—	—
III-49 The IBM 650 computer can be operated properly only by people who know some electrical engineering.....	—	—	—
III-50 It has become necessary to write a detailed procedural manual for preparation of data to be used in the computer.....	—	—	—
III-51 The computer will change the work methods in all parts of the company.....	—	—	—

(Continuation of table on page 14)

STATEMENT	The company has:		
	<u>A</u> Said so	<u>B</u> Said the opposite	<u>C</u> Said nothing about the subject
III-52 Representatives of the IBM Corporation say that [REDACTED] is doing quite well in preparing for the computer.....	—	—	—
III-53 The computer will be handled by the automobile underwriting department.....	—	—	—
III-54 There will be a lot more people needed in the IBM accounting department as a result of the computer.....	—	—	—
III-55 The company will be able to issue policies more quickly thanks to the computer.....	—	—	—
III-56 The computer will soon be used for deciding which applications the company should accept and which it should reject.....	—	—	—
III-57 The computer will first be used for figuring loss ratios for each of the agents.....	—	—	—
III-58 The computer will figure out how the company should settle claims from a policyholder.....	—	—	—
III-59 The computer will not endanger anybody's employment at [REDACTED]	—	—	—

Now we would like to know what you personally think will happen as a result of the computer. Below are several questions. Mark your answer in one of the columns "Yes", "Possibly", and "No", depending on your opinion.

	<u>In your opinion:</u>	Your answer		
		Yes	Possibly	No
III-60	Will the computer make mistakes of its own?.....	—	—	—
III-61	Will the computer change the work methods in all parts of the company?.....	—	—	—
III-62	Will the company be able to issue policies more quickly thanks to the computer?.....	—	—	—
III-63	Will the computer soon be used for deciding which applications the company should accept and which it should reject?.....	—	—	—
III-64	Will the computer endanger anybody's employment at [redacted]?.....	—	—	—
III-65	Will the computer make jobs too difficult to understand for a lot of people?.....	—	—	—
III-66	Will a lot of people be able to use more of their skills as a result of the installation of the computer?.....	—	—	—
III-67	Will the computer actually help increase employment at [redacted]?.....	—	—	—

The following items deal with preferences about changes in your job:

IV-40 If I could do as I pleased, I would change the kind of work I do every few months.

- 5. I strongly agree
- 4. I agree a little
- 3. I neither agree nor disagree
- 2. I disagree a little
- 1. I strongly disagree

IV-41 One can never feel at ease on a job where the ways of doing things are always being changed.

- 1. I strongly agree
- 2. I agree a little
- 3. I neither agree nor disagree
- 4. I disagree a little
- 5. I strongly disagree

IV-42 The trouble with most jobs is that you just get used to doing things in one way and then they want you to do them differently.

- 1. I strongly agree
- 2. I agree a little
- 3. I neither agree nor disagree
- 4. I disagree a little
- 5. I strongly disagree

IV-43 I would prefer to stay with a job I know I can handle than to change to one where most things would be new to me.

- 1. I strongly agree
- 2. I agree a little
- 3. I neither agree nor disagree
- 4. I disagree a little
- 5. I strongly disagree

IV-44 The trouble with many people is that when they find a job they can do well they don't stick with it.

- 1. I strongly agree
- 2. I agree a little
- 3. I neither agree nor disagree
- 4. I disagree a little
- 5. I strongly disagree

IV-45 I like a job where I know that I will be doing my work about the same way from one week to the next.

- 1. I strongly agree
- 2. I agree a little
- 3. I neither agree nor disagree
- 4. I disagree a little
- 5. I strongly disagree

IV-46 When I get used to doing things in one way it is disturbing to have to change to a new method.

- 1. I strongly agree
- 2. I agree a little
- 3. I neither agree nor disagree
- 4. I disagree a little
- 5. I strongly disagree

IV-47 It would take a sizable raise in pay to get me to accept a different job here.

- 1. I strongly agree
- 2. I agree a little
- 3. I neither agree nor disagree
- 4. I disagree a little
- 5. I strongly disagree

IV-48 There are many unnecessary tasks performed in this company.

- 1. I strongly agree
- 2. I agree
- 3. I neither agree nor disagree
- 4. I disagree
- 5. I strongly disagree

IV-49 This company is slow in adopting more efficient methods of work.

- 1. I strongly agree
- 2. I agree
- 3. I neither agree nor disagree
- 4. I disagree
- 5. I strongly disagree

IV-50 It is hard to gain acceptance of proposals for changes that would lead to increased efficiency.

- 1. I strongly agree
- 2. I agree
- 3. I neither agree nor disagree
- 4. I disagree
- 5. I strongly disagree

IV-51 Many persons in this company are so used to doing things in the present way that they cannot see the advantages of new methods of work.

- 1. I strongly agree
- 2. I agree
- 3. I neither agree nor disagree
- 4. I disagree
- 5. I strongly disagree

IV-52 Personal interests are too often allowed to stand in the way of improved efficiency in this company.

- 1. I strongly agree
- 2. I agree
- 3. I neither agree nor disagree
- 4. I disagree
- 5. I strongly disagree

Some supervisors are more likely to handle certain situations in one way than in another way.

Check the one answer which best describes the way your supervisor would handle each of the following situations. Notice: "Supervisor" refers to the person to whom you report directly.

V-40 What is your supervisor's name? _____

V-41 How long has this person been your supervisor? _____ years _____ months

V-42 When a question arises about how something should be done, my supervisor is most apt to

- _____ 1. Insist that the individual should adjust to the work in his own way.
- _____ 2. Insist that everything be done in the supervisor's way.
- _____ 3. Insist that the work group should come to a common agreement about the work.
- _____ 4. Insist everything be done according to company rules and regulations.

V-43 When my supervisor finds someone disagreeing with him, he is most likely to

- _____ 1. Refer to his own experience and know-how to back up his opinions.
- _____ 2. Try to persuade those who disagree with him.
- _____ 3. Refer to the company policy and procedures to back his opinions.
- _____ 4. Go along with the decision of the work group in deciding the issue.

V-44 My supervisor would prefer to hire a person who is

- _____ 1. Intelligent and has a good deal of drive.
- _____ 2. A hard worker, who doesn't need much supervision.
- _____ 3. Open-minded and willing to share responsibilities.
- _____ 4. Agreeable and willing to follow the regulations.

V-45 Ratings and promotions in this department seem to be based on

- _____ 1. A person's records which show his job skills, length of employment, etc.
- _____ 2. A person's technical knowledge and experience in the department.
- _____ 3. A person's ambition and ability to learn.
- _____ 4. Recommendations by both supervisors and employees.

V-46 My supervisor is most apt to give out new orders and information by

1. Discussing them with the group, getting the group's comments and questions.
2. Sending a written notice to every employee concerned.
3. Explaining the orders or information to each employee concerned.
4. Telling each employee about them informally at the appropriate time and place.

V-47 My supervisor seems most interested in developing his ability to

1. Properly make reports, handle paperwork, etc.
2. Handle any problems of work flow, machine operation, etc.
3. Understand employees' ideas, interests and standards.
4. Deal with individuals efficiently without causing friction.

V-48 My supervisor seems to feel that he should

1. Not use his authority -- respect the employees' opinions.
2. Not make a snap judgment -- be systematic and fair.
3. Have employees respect his authority -- make prompt, firm decisions.
4. Avoid unnecessary conflicts -- give praise and personal attention.

V-49 My supervisor's idea of training seems to be

1. To repeat instructions until he's satisfied that the person is really efficient.
2. To develop the person's interest in the job by praising his progress.
3. To make sure the person has a complete set of instructions and job requirements.
4. To explain what the job requires then let the person develop his own methods.

V-50 If a major reorganization of the work in this department were necessary, my supervisor would probably

1. Notify us that the personnel department would reassign us as fairly as possible.
2. Try to persuade certain employees to take the new assignments.
3. Ask the work group for suggestions on how the reassignments should be made.
4. Tell employees they were being reassigned in the best way to get the work out.

V-51 My supervisor tries to get the work out by

- 1. Carefully directing and disciplining employees.
- 2. Appealing to the individual's desire for self-improvement.
- 3. Following plans for scheduling work in detail.
- 4. Trying to get employees to work together as a team.

V-52 My supervisor seems to be most interested in

- 1. A neat, well-regulated department.
- 2. A friendly, well-integrated work group.
- 3. An efficient, well-controlled department.
- 4. An ambitious, competitive spirit among employees.

V-53 If we decided on a new way to handle part of our work, our supervisor would probably

- 1. Tell us to go ahead if he was sure it would be more efficient.
- 2. Talk to us individually to see how each of us felt about it.
- 3. Urge us to go ahead if none of us had any questions about it.
- 4. Insist that we wait until he had consulted his boss about it.

V-54 If a disagreement were to arise -- say, about vacation schedule -- my supervisor would probably

- 1. Remind us of the loyalty we owe to the company.
- 2. Emphasize the need for a cooperative settlement by the work group.
- 3. Suggest that the ambitious person gets ahead in the long run.
- 4. Emphasize the need to follow his (her) work schedule to get the work out.

V-55 My supervisor seems to depend most on

- 1. His (her) knowledge of company policies and procedures.
- 2. His (her) ability to work with the employees as a group.
- 3. His (her) ability to influence people to do what has to be done.
- 4. His (her) technical knowledge of the jobs and the work flow.

V-56 If one of us continued to pester our supervisor with a minor complaint, he (she) would probably

1. Help him to become interested in something more constructive.
2. Politely but firmly show him just why the complaint is not justified.
3. Talk the problem over with him, trying to understand how he feels about it.
4. Send him up the line to the proper authority for an official and final answer that the employee will have to accept.

V-57 If I suggested an improvement in the section, my supervisor would be most apt to

1. Urge me to send it directly to the Operating Committee.
2. Urge me to talk it over with the others for their comments.
3. Ask to have time to go over it before he (she) makes any comments.
4. Go over it with me; point out that this is the way to get ahead.

V-58 In general, my supervisor seems to

1. Create an "I don't care" attitude among the employees.
2. Make people antagonistic toward him.
3. Create cooperation among the employees.
4. Create competition between employees.

V-57 The last time there was a change in our work routine, my supervisor

1. Talked to each individual about the changes in his job.
2. Asked the group how the problem should be handled.
3. Read (or posted) the instructions which he had received.
4. Told us how he thought the change should be handled.

V-60 My supervisor attempts to maintain discipline by

1. Letting each employee be responsible for his own conduct once he knows the rules.
2. Helping employees work out a common standard of action based on the rules.
3. Taking direct personal action against serious violators of the rules.
4. Treating all employees alike and according to the rules.

V-61 Supervisors seem to be chosen around here on the basis of

- 1. How well they are liked by fellow employees
- 2. Their ability to influence people to get things done.
- 3. How well they know official policy.
- 4. How well they know the technical aspect of the work.

V-62 I feel that the main reason my supervisor handles the above situations the way he does is:

- 1. The attitude of his boss about supervision.
- 2. The general company policy on supervision.
- 3. His own attitude about supervision.
- 4. The attitude of his employees about supervision.
- 5. Other (explain) _____
- 9. I have no idea.

V-63 How do you feel about the relationship between you and your supervisor?

- 1. Completely satisfied.
- 2. Very satisfied.
- 3. Quite satisfied.
- 4. Somewhat satisfied.
- 5. Not satisfied.

V-64 How do you feel about the way your supervisor handles his (her) job?

- 1. Completely satisfied.
- 2. Very satisfied.
- 3. Quite satisfied.
- 4. Somewhat satisfied.
- 5. Not satisfied.

The following questions deal with your personal attitudes and opinions about a number of important social and personal questions. The best answer to each statement below is your personal opinion.

VI-40 Even though freedom of speech for all groups is a worthwhile goal, it is unfortunately necessary to restrict the freedom of certain political groups.

- 1. I disagree very much.
- 2. I disagree on the whole.
- 3. I disagree a little.
- 4. I agree a little.
- 5. I agree on the whole.
- 6. I agree very much.

VI-41 The worst crime a person could commit is to attack publicly the people who believe in the same thing he does.

- 6. I agree very much.
- 5. I agree on the whole.
- 4. I agree a little.
- 3. I disagree a little.
- 2. I disagree on the whole.
- 1. I disagree very much.

VI-42 It is only natural that a person would have a much better acquaintance with ideas he believes in than with ideas he opposes.

- 1. I disagree very much.
- 2. I disagree on the whole.
- 3. I disagree a little.
- 4. I agree a little.
- 5. I agree on the whole.
- 6. I agree very much.

VI-43 In this complicated world of ours the only way we can know what's going on is to rely on leaders or experts who can be trusted.

- 1. I disagree very much.
- 2. I disagree on the whole.
- 3. I disagree a little.
- 4. I agree a little.
- 5. I agree on the whole.
- 6. I agree very much.

VI-44 The present is all too often full of unhappiness. It is only the future that counts.

- 6. I agree very much.
- 5. I agree on the whole.
- 4. I agree a little.
- 3. I disagree a little.
- 2. I disagree on the whole.
- 1. I disagree very much.

VI-45 It is only when a person devotes himself to an ideal or cause that life becomes meaningful.

- 6. I agree very much.
- 5. I agree on the whole.
- 4. I agree a little.
- 3. I disagree a little.
- 2. I disagree on the whole.
- 1. I disagree very much.

VI-46 There are two kinds of people in this world: those who are for the truth and those who are against the truth.

- 1. I disagree very much.
- 2. I disagree on the whole.
- 3. I disagree a little.
- 4. I agree a little.
- 5. I agree on the whole.
- 6. I agree very much.

VI-47 Man on his own is a helpless and miserable creature.

- 1. I disagree very much.
- 2. I disagree on the whole.
- 3. I disagree a little.
- 4. I agree a little.
- 5. I agree on the whole.
- 6. I agree very much.

VI-48 It is only natural for a person to be rather fearful of the future.

- 6. I agree very much.
- 5. I agree on the whole.
- 4. I agree a little.
- 3. I disagree a little.
- 2. I disagree on the whole.
- 1. I disagree very much.

VI-49 It is better to be a dead hero than a live coward.

- 6. I agree very much.
- 5. I agree on the whole.
- 4. I agree a little.
- 3. I disagree a little.
- 2. I disagree on the whole.
- 1. I disagree very much.

VI-50 The main thing in life is for a person to want to do something important.

- 1. I disagree very much.
- 2. I disagree on the whole.
- 3. I disagree a little.
- 4. I agree a little.
- 5. I agree on the whole.
- 6. I agree very much.

VI-51 If something grows up over a long time, there will always be much wisdom in it.

- 1. I disagree very much.
- 2. I disagree on the whole.
- 3. I disagree a little.
- 4. I agree a little.
- 5. I agree on the whole.
- 6. I agree very much.

VI-52 It bothers me when something unexpected interrupts my daily routine.

- 1. I disagree very much.
- 2. I disagree on the whole.
- 3. I disagree a little.
- 4. I agree a little.
- 5. I agree on the whole.
- 6. I agree very much.

VI-53 Young people would be a lot better off if they all received strict discipline from their parents.

- 6. I agree very much.
- 5. I agree on the whole.
- 4. I agree a little.
- 3. I disagree a little.
- 2. I disagree on the whole.
- 1. I disagree very much.

VI-54 A well-ordered way of life, with regular hours and an established routine, is best for my kind of temperament.

- 6. I agree very much.
- 5. I agree on the whole.
- 4. I agree a little.
- 3. I disagree a little.
- 2. I disagree on the whole.
- 1. I disagree very much.

VI-55 Bosses should say just what is to be done and exactly how to do it if they expect us to do a good job.

- 1. I disagree very much.
- 2. I disagree on the whole.
- 3. I disagree a little.
- 4. I agree a little.
- 5. I agree on the whole.
- 6. I agree very much.

VI-56 I am not, and never have been, the sort of person who would do something dangerous for the thrill of it.

- 6. I agree very much.
- 5. I agree on the whole.
- 4. I agree a little.
- 3. I disagree a little.
- 2. I disagree on the whole.
- 1. I disagree very much.

VI-57 Do things here at work ever make you feel "jumpy" or nervous?

- 1. Never.
- 2. Very seldom.
- 3. Seldom.
- 4. Sometimes.
- 5. Quite often.
- 6. Very often.

VI-58 When things get boring, I'm the sort of person who likes to stir up some excitement.

- 1. I agree very much.
- 2. I agree on the whole.
- 3. I agree a little.
- 4. I disagree a little.
- 5. I disagree on the whole.
- 6. I disagree very much.

VI-59 Frankly, most things that happen to me don't affect my feelings much one way or the other.

- 1. I agree very much.
- 2. I agree on the whole.
- 3. I agree a little.
- 4. I disagree a little.
- 5. I disagree on the whole.
- 6. I disagree very much.

VI-60 How hard do you usually have to work in order to get your work done?

- 1. I hardly ever get done, although I work very hard to do so.
- 2. I know I can hardly ever get done anyway, so I work at the pace that seems most comfortable for me.
- 3. I sometimes get done, but I have to work very hard to do so.
- 4. I sometimes get done, and I work at the pace that seems most comfortable for me.
- 5. I almost always get done, but I have to work very hard to do so.
- 6. I almost always get done, and I work at the pace that seems most comfortable for me.

V-67 The following questions are about the group of people with whom you work.

About how many people are there in the group with whom you work?

- 1. 2
- 2. 3 - 5
- 3. 6 - 10
- 4. 11 - 15
- 5. More than 15
- 6. I don't work with any one group of people.

V-68 Do you feel that you are really a part of your work group?

- 1. I'm really a part of my work group.
- 2. I'm included in most ways.
- 3. I'm included in some ways, but not in others.
- 4. I don't feel I really belong.
- 5. I don't work with any one group of people.

V-69 If you had a chance to do the same kind of work for the same pay in another work group, how would you feel about moving?

- 1. I would want very much to move.
- 2. I would rather move than stay where I am.
- 3. It would make no difference to me.
- 4. I would rather stay where I am than move.
- 5. I would want very much to stay where I am.
- 6. I don't work with any one group of people.

How does your work group compare with other work groups in this company on each of the following points?

V-70 The way members get along together 1. Better than most 2. About the same as most 3. Not as well as most

V-71 The way members stick together 1. Better than most 2. About the same as most 3. Not as well as most

V-72 The way members help each other on the job 1. Better than most 2. About the same as most 3. Not as well as most

4. I don't work with any one group of people.

V-73 All things considered, how easy would it be for ██████████ to find someone else to do the job you are now doing?

- 1. Very difficult.
- 2. Fairly difficult.
- 3. A little bit difficult.
- 4. Fairly easy.
- 5. Very easy.
- 9. Don't know.

V-75 As far as you can tell, what do your supervisors think about your work performance here at [REDACTED]?

- 1. They like it very much.
- 2. They like it.
- 3. They like most things about it, but there are some exceptions.
- 4. There are several things about my work performance that they don't like.
- 5. There are many things about my work performance that they don't like.
- 9. Don't know.

V-76 How qualified do you feel you are to handle different jobs in this company?

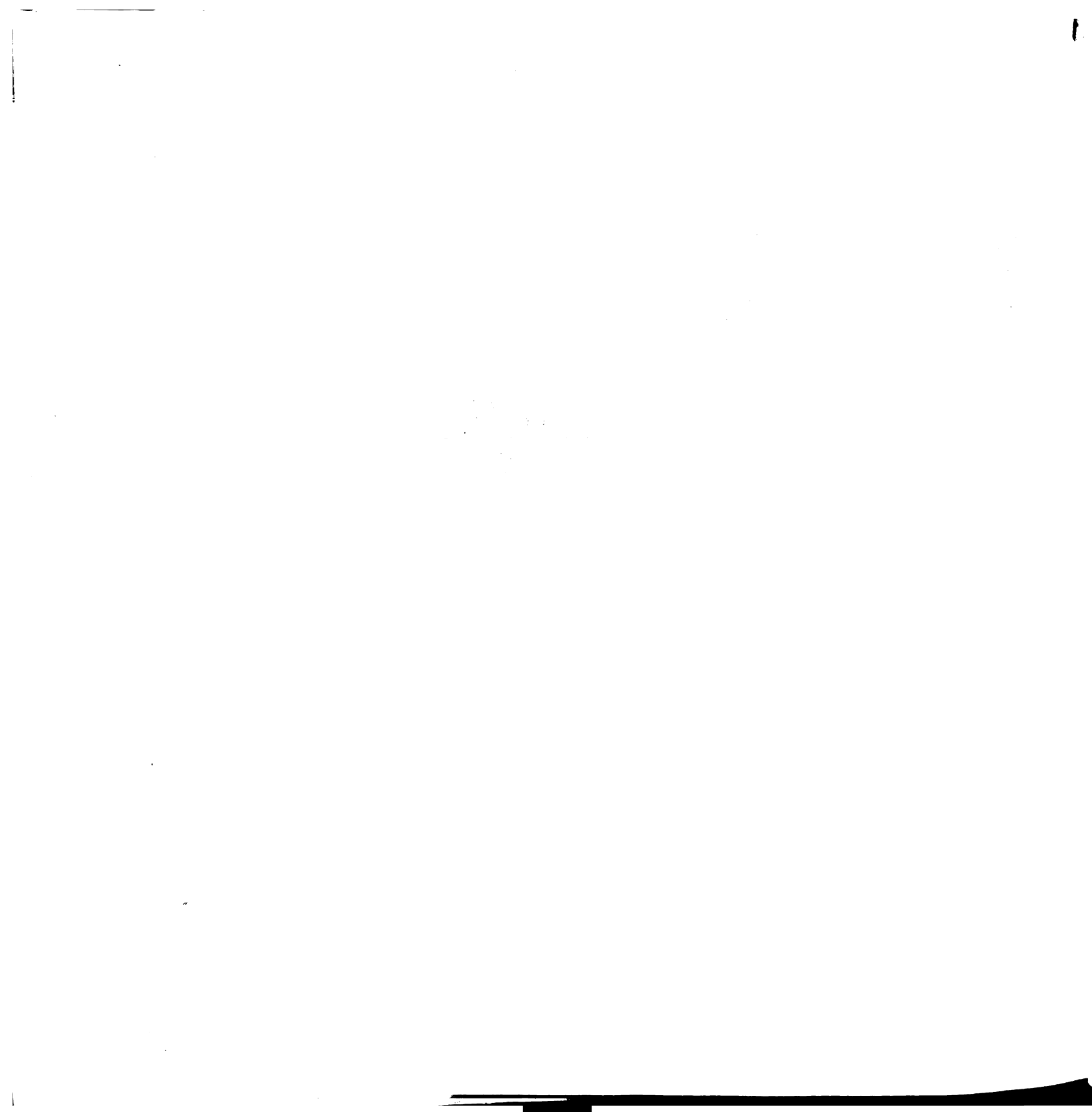
- 1. Much more than most employees.
- 2. More than most employees.
- 3. About the same as most employees.
- 4. Less than most employees.
- 5. Much less than most employees.

V-77 Considering what you want in a job, how do the other jobs for which you are qualified compare with your present job?

- 1. All are better than my present job.
- 2. Most are better but a few are worse than my present job.
- 3. Some are better and some are worse than my present job.
- 4. A few are better but most are worse than my present job.
- 5. All are worse than my present job.

The check list on the next page gives you an opportunity to express how you feel about certain aspects of your job. Consider the first aspect listed in the column to the left. Place a check mark under the statement in Column A which best describes how satisfied you are with this aspect of your job. Then decide whether you want an increase in this aspect of your job, a decrease in it, or no change in it, and place a check mark under the appropriate statement in Column B. Then go on to the next aspect.

Example: Suppose the job aspect had to do with the amount of illumination on your job. If you felt "somewhat satisfied" with the amount of illumination and if you wanted a decrease in illumination (to reduce glare), you should put one check mark under "somewhat satisfied" in Column A and one check mark under "a decrease" in Column B.



Job Aspect	Column A					Column B			
	Completely satisfied	Very satisfied	Quite satisfied	Somewhat satisfied	Not satisfied	For this aspect I would want to see:	an increase	no change	a decrease
1. The amount of variety in IV-53 my work.....	—	—	—	—	—	an increase	—	—	—
2. The amount of work re- IV-54 quired on my job.....	—	—	—	—	—	an increase	—	—	—
3. The degree of accuracy IV-55 demanded by my job.....	—	—	—	—	—	an increase	—	—	—
4. My control over the pace IV-56 of my work.....	—	—	—	—	—	an increase	—	—	—
5. The importance of my job IV-57 for the company.....	—	—	—	—	—	an increase	—	—	—
6. The amount of supervision IV-58 I get on my job.....	—	—	—	—	—	an increase	—	—	—
7. The amount of skill needed IV-59 on my job.....	—	—	—	—	—	an increase	—	—	—
8. The amount of responsi- IV-60 bility demanded by my job..	—	—	—	—	—	an increase	—	—	—
9. The amount of planning I IV-61 have to do on my job.....	—	—	—	—	—	an increase	—	—	—
10. The amount of judgment I IV-62 have to use or my job.....	—	—	—	—	—	an increase	—	—	—
11. The degree to which my IV-63 work is interesting.....	—	—	—	—	—	an increase	—	—	—
12. The amount of security I IV-64 feel on my job.....	—	—	—	—	—	an increase	—	—	—
13. My chances for promotion to IV-65 a better job.....	—	—	—	—	—	an increase	—	—	—
14. The amount of pay I get on IV-66 my job.....	—	—	—	—	—	an increase	—	—	—

X-36 How satisfied are you with the way changes are handled around here?

1. Completely satisfied
 2. Very satisfied
 3. Quite satisfied
 4. Somewhat satisfied
 5. Not satisfied

X-37 How satisfied are you with the kind of work you do?

1. Completely satisfied
 2. Very satisfied
 3. Quite satisfied
 4. Somewhat satisfied
 5. Not satisfied

X-38 How satisfied are you with the company you work for?

1. Completely satisfied
 2. Very satisfied
 3. Quite satisfied
 4. Somewhat satisfied
 5. Not satisfied

X-39 Taking everything into account, how satisfied are you with your job?

1. Completely satisfied
 2. Very satisfied
 3. Quite satisfied
 4. Somewhat satisfied
 5. Not satisfied

IV-67 Why are you working? _____

IV-68 If you received a large inheritance or a large sum of money from some source, would you still work?

Yes _____ No _____

Why? _____

IV-69 If you received a large inheritance or a large sum of money from some source, would you still work at _____?

Yes _____ No _____

Why? _____

X-35 How easy would it be for you to get a job as good as the one you now have at some other company?

- 1. Very easy
- 2. Fairly easy
- 3. A little bit difficult
- 4. Fairly difficult
- 5. Very difficult
- 6. I don't know

X-34 How many employees in the company think that your job is more desirable than their own jobs?

- 1. Almost all
- 2. Many
- 3. Some
- 4. Few
- 5. Almost none

X-33 What do you expect to be doing five years from now?

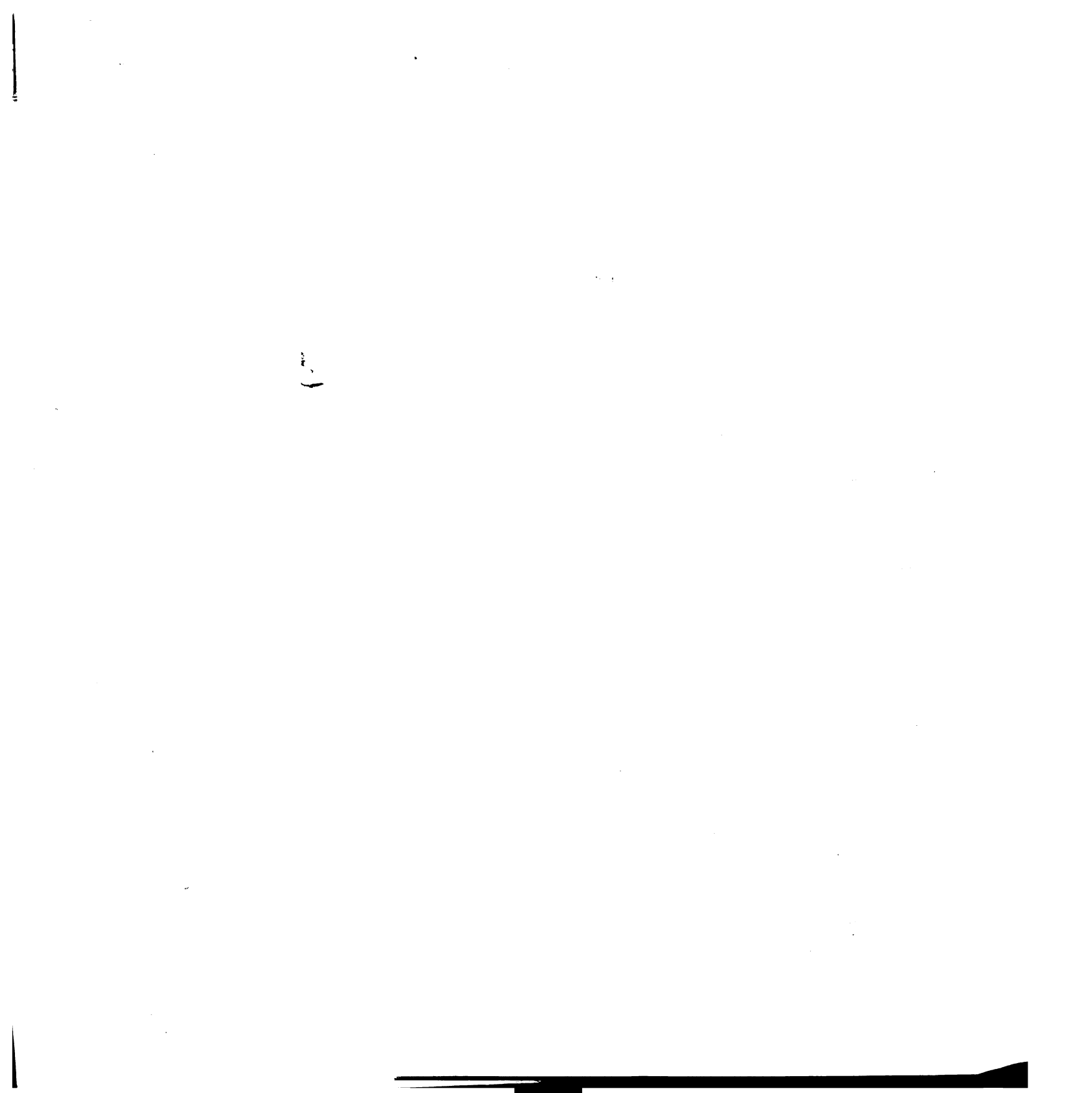
- 1. Being a supervisor in this company
- 2. Working at the same job in this company
- 3. Working at a better job in this company
- 4. Being a supervisor in some other company
- 5. Working at a nonsupervisory job elsewhere
- 6. Running own business
- 7. Being a housewife
- 8. Retired
- 9. Other _____
- 0. Don't know

IV-70 Are you now taking any special training?

- 1. No, and I don't really plan to
- 2. No, and I don't know whether I will or not
- 3. No, but I plan to within 5 years
- 4. Yes, training to help me on the job I'm on now
- 5. Yes, training for a different job in this company
- 6. Yes, training for a job elsewhere
- 7. Yes, training to help me enter a profession or start my own business

X-32 What do you think the possibilities are of your getting a promotion in the next year?

- 1. Very likely
- 2. Fairly likely
- 3. Likely in some ways, not in others
- 4. Unlikely
- 5. Very unlikely



X-17 How many years have you worked since leaving school?

- 1. Less than 1 year
- 2. 1 - 2 years
- 3. 3 - 5 years
- 4. 6 - 10 years
- 5. 11 or more years

X-18 How many more years do you expect to work?

- 1. Less than 1 year
- 2. 1 - 2 years
- 3. 3 - 5 years
- 4. 6 - 10 years
- 5. 11 or more years
- 9. I don't know

- X-12 When were you hired by [REDACTED]? Year _____ Month _____
- X-10,11 What is your present job title? (example: key-punch operator) _____
- X-13 When did you start on your present job? Year _____ Month _____
- X-4,5 What is your section and department? _____

- X-14 Within the past 6 months have you tried to transfer from your present job to another job or department within the company? Yes _____ No _____
- X-15 Within the past 6 months have you registered with any employment agency or applied for a job with any other organization? Yes _____ No _____
- X-16 How many people do you supervise directly here at work?
_____ people
- X-23 Are you the only wage earner in your household? Yes _____ No _____
- X-24 Are you the main wage earner in your household? Yes _____ No _____
- X-25 Could your household live adequately if you were not working? Yes _____ No _____
- X-26 Is your household living adequately now? Yes _____ No _____
- X-27 What is your present salary before taxes and other deductions?
_____ dollars
Check whether this is per month _____, week _____, or 2 weeks _____.
- X-9 Date of birth: Month _____ Day _____ Year _____
- X-6 Sex: Male _____ Female _____
- X-7 Marital status: Single _____ Married _____ Divorced _____
Separated _____
Widowed _____
- X-8 How many years of school have you completed? Circle highest grade completed.
- | | | | | | | | | |
|---|---|---|----|----|----|-----------------|---------|------------------|
| 7 | 8 | 9 | 10 | 11 | 12 | Some
College | College | Graduate
Work |
|---|---|---|----|----|----|-----------------|---------|------------------|

1

X-19 Have you spent most of your life in a

- 1. farm area
- 2. small town
- 3. city

X-20 What is (was) your father's occupation? (examples: farmer, machinist, doctor) _____

X-21 What is (was) your father's annual income?

- 1. less than 3000 dollars
- 2. 3000 - 7000 dollars
- 3. 7000 - 15,000 dollars
- 4. over 15,000 dollars

X-22 In your community do you consider yourself a member of the

- 1. upper class
- 2. upper middle class
- 3. middle class
- 4. lower middle class
- 5. working class
- 6. lower class

Thank you for your cooperation. Now tear off the ballot at the bottom of the cover page of the questionnaire. Place the ballot in the "Ballot Box" and place the questionnaire in the box marked "Questionnaires".

MICHIGAN STATE UNIVERSITY

Labor and Industrial Relations Center

May 1958

To: Employees of [REDACTED] Insurance Company

The Labor and Industrial Relations Center at Michigan State University is carrying on a broad program of research having to do with people working together effectively in industrial organizations. Much of the research consists of getting the ideas and opinions of people about their jobs.

Last November you were asked to fill out a questionnaire as a part of this series of studies. We are grateful for the very substantial help you gave us at that time and are finding the information we received very helpful in our research.

It is important to our research to know whether the conclusions we obtain at one time will remain true at a later date. We are therefore asking you to participate in this second questionnaire study.

As you go through this questionnaire, those of you who participated in the November study will recognize questions that we also asked in November. We have included them because we need to know how you look on your job and the company at this time.

Those of you who were not present to participate in the November study will have an opportunity to express how you feel about a variety of aspects of your job and your working situation.

The value of this study depends on the sincerity and care with which you answer the questions. It is important to get your real feelings. We are looking for frank statements about your attitudes, feelings, opinions and judgments about your job.

The answers that you give will be made available only to the research team in the Labor and Industrial Relations Center. No one connected in any way with your organization will see or use any of the individual questionnaires or be able in any way to find out what kind of answers you have given. Your information will be held in the strictest confidence and the results of the study will be tabulated on a group basis only.

A report on the findings of this study and of the November study will be made to you before the end of 1958.

Einar Hardin
Research Associate
Labor and Industrial Relations Center
Michigan State University

Please print your name below. When you have finished the questionnaire, tear this part off and place it in the "ballot box" by the door. THIS INFORMATION WILL BE USED TO HELP US ANALYZE THE QUESTIONNAIRE. IT WILL NOT BE AVAILABLE TO ANYONE IN THE COMPANY.

00217

Name _____

[REDACTED]

... ..

... ..

... ..

... ..

... ..

... ..

First is a check list that gives you an opportunity to express how you feel about certain aspects of your job. Consider the first aspect listed in the column to the left. Place a check mark under the statement which best describes how satisfied you are with this aspect of your job.

Job Aspect	Completely satisfied	Very satisfied	Quite satisfied	Somewhat satisfied	Not satisfied
I ₉ The amount of variety in my work.....	_____	_____	_____	_____	_____
I ₁₀ The amount of work required on my job.....	_____	_____	_____	_____	_____
I ₁₁ The degree of accuracy demanded by my job.....	_____	_____	_____	_____	_____
I ₁₂ My control over the pace of my work.....	_____	_____	_____	_____	_____
I ₁₃ The importance of my job for the company.....	_____	_____	_____	_____	_____
I ₁₄ The amount of supervision I get on my job.....	_____	_____	_____	_____	_____
I ₁₅ The amount of skill needed on my job.....	_____	_____	_____	_____	_____
I ₁₆ The amount of responsibility demanded by my job.....	_____	_____	_____	_____	_____
I ₁₇ The amount of planning I have to do on my job.....	_____	_____	_____	_____	_____
I ₁₈ The amount of judgment I have to use on my job.....	_____	_____	_____	_____	_____
I ₁₉ The degree to which my work is interesting.....	_____	_____	_____	_____	_____
I ₂₀ The amount of security I feel on my job.....	_____	_____	_____	_____	_____
I ₂₁ My chances for promotion to a better job.....	_____	_____	_____	_____	_____
I ₂₂ The amount of pay I get on my job.....	_____	_____	_____	_____	_____
-----	(1)	(2)	(3)	(4)	(5)

I 23 How do you feel about the relationship between you and your supervisor?

- 1. Completely satisfied
- 2. Very satisfied
- 3. Quite satisfied
- 4. Somewhat satisfied
- 5. Not satisfied

I 24 How satisfied are you with the way changes are handled around here?

- 1. Completely satisfied
- 2. Very satisfied
- 3. Quite satisfied
- 4. Somewhat satisfied
- 5. Not satisfied

I 25 How satisfied are you with the kind of work you do?

- 1. Completely satisfied
- 2. Very satisfied
- 3. Quite satisfied
- 4. Somewhat satisfied
- 5. Not satisfied

I 26 How satisfied are you with the company you work for?

- 1. Completely satisfied
- 2. Very satisfied
- 3. Quite satisfied
- 4. Somewhat satisfied
- 5. Not satisfied

I 27 Taking everything into account, how satisfied are you with your job?

- 1. Completely satisfied
- 2. Very satisfied
- 3. Quite satisfied
- 4. Somewhat satisfied
- 5. Not satisfied

I 28 What are the things you like best about working at [redacted] ? _____

I 29 What are the things you like least about working at [redacted] ? _____

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that this is crucial for ensuring the integrity of the financial statements and for providing a clear audit trail.

2. The second part of the document outlines the various methods used to collect and analyze data. It includes a detailed description of the sampling process and the statistical techniques employed to ensure the reliability of the results.

3. The third part of the document provides a comprehensive overview of the findings of the study. It highlights the key areas where significant differences were observed and discusses the potential reasons for these variations.

4. The fourth part of the document discusses the implications of the findings and offers recommendations for future research. It suggests that further studies should be conducted to explore the underlying causes of the observed trends and to develop more effective strategies for data collection and analysis.

5. The fifth part of the document concludes the report by summarizing the main points and reiterating the importance of the research. It expresses the hope that the findings will be useful to the readers and that they will contribute to the advancement of the field.

6. The sixth part of the document contains a list of references and a list of figures. The references include a variety of academic journals, books, and other sources that were consulted during the research process. The figures provide a visual representation of the data and help to illustrate the key findings of the study.

7. The seventh part of the document is a list of appendices. These appendices contain additional information that is relevant to the study but is too detailed to include in the main body of the report. They include a list of abbreviations, a list of symbols, and a list of units.

The following questions concern your immediate supervisor and the company you work for:

I 30 My supervisor does his best to keep me informed about changes that will affect me.

- 1. I strongly agree
- 2. I agree
- 3. I neither agree, nor disagree
- 4. I disagree
- 5. I strongly disagree

I 31 Often my supervisor's decisions are pretty arbitrary.

- 5. I strongly agree
- 4. I agree
- 3. I neither agree, nor disagree
- 2. I disagree
- 1. I strongly disagree

I 32 My supervisor is quite willing to stand up for my rights in the company.

- 1. I strongly agree
- 2. I agree
- 3. I neither agree, nor disagree
- 4. I disagree
- 5. I strongly disagree

I 33 There is not much my supervisor can do to protect my interests in the company.

- 5. I strongly agree
- 4. I agree
- 3. I neither agree, nor disagree
- 2. I disagree
- 1. I strongly disagree

I 34 The company keeps the welfare of its employees in mind whenever it makes an important decision.

- 1. I strongly agree
- 2. I agree
- 3. I neither agree, nor disagree
- 4. I disagree
- 5. I strongly disagree

I 35 The company goes out of its way to help employees who run into difficulties.

- 1. I strongly agree
- 2. I agree
- 3. I neither agree, nor disagree
- 4. I disagree
- 5. I strongly disagree

the first of these is the fact that the system is not in a steady state.

The second is the fact that the system is not in a steady state.

The third is the fact that the system is not in a steady state.

The fourth is the fact that the system is not in a steady state.

The fifth is the fact that the system is not in a steady state.

The sixth is the fact that the system is not in a steady state.

The seventh is the fact that the system is not in a steady state.

The eighth is the fact that the system is not in a steady state.

The ninth is the fact that the system is not in a steady state.

The tenth is the fact that the system is not in a steady state.

The eleventh is the fact that the system is not in a steady state.

The twelfth is the fact that the system is not in a steady state.

The thirteenth is the fact that the system is not in a steady state.

- I 36 The company is much more concerned with cost of operation than with employee welfare.
- _____ 5. I strongly agree
 _____ 4. I agree
 _____ 3. I neither agree, nor disagree
 _____ 2. I disagree
 _____ 1. I strongly disagree
- I 37 Whatever the company decides will be for the benefit of most employees.
- _____ 1. I strongly agree
 _____ 2. I agree
 _____ 3. I neither agree, nor disagree
 _____ 4. I disagree
 _____ 5. I strongly disagree
- I 38 This company seems to be run more competently than are most other companies I know about.
- _____ 1. I strongly agree
 _____ 2. I agree
 _____ 3. I neither agree, nor disagree
 _____ 4. I disagree
 _____ 5. I strongly disagree
- The following questions deal with preferences about changes in your job:
- I 39 If I could do as I pleased, I would change the kind of work I do every few months.
- _____ 5. I strongly agree
 _____ 4. I agree a little
 _____ 3. I neither agree, nor disagree
 _____ 2. I disagree a little
 _____ 1. I strongly disagree
- I 40 One can never feel at ease on a job where the ways of doing things are always being changed.
- _____ 1. I strongly agree
 _____ 2. I agree a little
 _____ 3. I neither agree, nor disagree
 _____ 4. I disagree a little
 _____ 5. I strongly disagree
- I 41 The trouble with most jobs is that you just get used to doing things in one way and then they want you to do them differently.
- _____ 1. I strongly agree
 _____ 2. I agree a little
 _____ 3. I neither agree, nor disagree
 _____ 4. I disagree a little
 _____ 5. I strongly disagree

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that this is crucial for ensuring the integrity of the financial data and for facilitating audits.

2. The second part of the document outlines the various methods used to collect and analyze data. It describes how different types of information are gathered and how they are processed to generate meaningful insights.

3. The third part of the document focuses on the application of these findings. It details how the data is used to inform decision-making and to identify areas for improvement within the organization.

4. The fourth part of the document discusses the challenges associated with data management. It highlights the need for robust security measures and the importance of ensuring data accuracy and consistency.

5. The final part of the document provides a summary of the key points discussed. It reiterates the importance of a data-driven approach and offers recommendations for future research and development.

I 42 I would prefer to stay with a job I know I can handle than to change to one where most things would be new to me.

- 1. I strongly agree
- 2. I agree a little
- 3. I neither agree, nor disagree
- 4. I disagree a little
- 5. I strongly disagree

I 43 The trouble with many people is that when they find a job they can do well they don't stick with it.

- 1. I strongly agree
- 2. I agree a little
- 3. I neither agree, nor disagree
- 4. I disagree a little
- 5. I strongly disagree

I 44 I like a job where I know that I will be doing my work about the same way from one week to the next.

- 1. I strongly agree
- 2. I agree a little
- 3. I neither agree, nor disagree
- 4. I disagree a little
- 5. I strongly disagree

I 45 When I get used to doing things in one way it is disturbing to have to change to a new method.

- 1. I strongly agree
- 2. I agree a little
- 3. I neither agree, nor disagree
- 4. I disagree a little
- 5. I strongly disagree

I 46 It would take a sizable raise in pay to get me to accept a different job here.

- 1. I strongly agree
- 2. I agree a little
- 3. I neither agree, nor disagree
- 4. I disagree a little
- 5. I strongly disagree

I 47 There are many unnecessary tasks performed in this company.

- 1. I strongly agree
- 2. I agree
- 3. I neither agree, nor disagree
- 4. I disagree
- 5. I strongly disagree

I 48 This company is slow in adopting more efficient methods of work.

- 1. I strongly agree
- 2. I agree
- 3. I neither agree, nor disagree
- 4. I disagree
- 5. I strongly disagree

I 49 It is hard to gain acceptance of proposals for changes that would lead to increased efficiency.

- 1. I strongly agree
- 2. I agree
- 3. I neither agree, nor disagree
- 4. I disagree
- 5. I strongly disagree

I 50 Many persons in this company are so used to doing things in the present way that they cannot see the advantages of new methods of work.

- 1. I strongly agree
- 2. I agree
- 3. I neither agree, nor disagree
- 4. I disagree
- 5. I strongly disagree

I 51 Personal interests are too often allowed to stand in the way of improved efficiency in this company.

- 1. I strongly agree
- 2. I agree
- 3. I neither agree, nor disagree
- 4. I disagree
- 5. I strongly disagree

The following questions are concerned with the contacts you have with other people in your work, and with how you feel about the information you receive regarding changes in your job.

I 52 During a regular workday I generally exchange information connected with my work with the following number of people:

- 1. None
- 2. 1 - 2
- 3. 3 - 5
- 4. 6 - 10
- 5. More than 10

I 53 My job requires me to give information to my supervisor:

- 1. Very frequently
- 2. Often
- 3. Sometimes
- 4. Seldom
- 5. Very infrequently

I 54 How satisfied are you with the number of opportunities you have to discuss things about your job with your supervisor?

- 1. Completely satisfied
- 2. Very satisfied
- 3. Quite satisfied
- 4. Somewhat satisfied
- 5. Not satisfied

1. The first part of the document is a list of names and addresses of the members of the committee. The names are listed in alphabetical order, and the addresses are given in full. The list includes names such as Mr. J. H. Smith, Mr. W. B. Jones, and Mr. C. D. Brown.

2. The second part of the document is a list of the names and addresses of the members of the committee who have been elected to the office of chairman. The names are listed in alphabetical order, and the addresses are given in full. The list includes names such as Mr. J. H. Smith, Mr. W. B. Jones, and Mr. C. D. Brown.

3. The third part of the document is a list of the names and addresses of the members of the committee who have been elected to the office of secretary. The names are listed in alphabetical order, and the addresses are given in full. The list includes names such as Mr. J. H. Smith, Mr. W. B. Jones, and Mr. C. D. Brown.

4. The fourth part of the document is a list of the names and addresses of the members of the committee who have been elected to the office of treasurer. The names are listed in alphabetical order, and the addresses are given in full. The list includes names such as Mr. J. H. Smith, Mr. W. B. Jones, and Mr. C. D. Brown.

5. The fifth part of the document is a list of the names and addresses of the members of the committee who have been elected to the office of clerk. The names are listed in alphabetical order, and the addresses are given in full. The list includes names such as Mr. J. H. Smith, Mr. W. B. Jones, and Mr. C. D. Brown.

6. The sixth part of the document is a list of the names and addresses of the members of the committee who have been elected to the office of auditor. The names are listed in alphabetical order, and the addresses are given in full. The list includes names such as Mr. J. H. Smith, Mr. W. B. Jones, and Mr. C. D. Brown.

7. The seventh part of the document is a list of the names and addresses of the members of the committee who have been elected to the office of assessor. The names are listed in alphabetical order, and the addresses are given in full. The list includes names such as Mr. J. H. Smith, Mr. W. B. Jones, and Mr. C. D. Brown.

I 55 How satisfied are you with the number of opportunities you have to talk with the people you supervise?

- 1. Completely satisfied
- 2. Very satisfied
- 3. Quite satisfied
- 4. Somewhat satisfied
- 5. Not satisfied

I 56 How satisfied are you with the information you receive concerning changes in the company and in your job?

- 1. Completely satisfied
- 2. Very satisfied
- 3. Quite satisfied
- 4. Somewhat satisfied
- 5. Not satisfied

In the right-hand column next to each item place a check mark under the statement which best describes your satisfaction with information received from the company.

ASPECTS OF INFORMATION	Satisfaction				
	Completely satisfied	Very satisfied	Quite satisfied	Somewhat satisfied	Not satisfied
I 57 Amount of information.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I 58 Accuracy of information.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I 59 Understandability of information.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I 60 Getting information soon enough.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

On the next page you will find a list of statements about aspects of your job. You are asked to answer the questions about each aspect of your job. "Has this aspect of your job changed in the past six months?" (Question "A"), and "How do you feel about the change (or lack of change) in this aspect of your job?" (Question "B")

1. If you had the same job title here at [redacted] six months ago, compare the way your job is now with the way it was six months ago on each of the job aspects.

2. If you had a different job here at [redacted] six months ago, compare your present job with the job you had six months ago on each of the job aspects.

3. If you have not been with [redacted] for at least six months, indicate any changes which have occurred in the aspects of your job since you came to [redacted].

Example: Suppose the statement had to do with hours of work. If you are working more hours now ("A") and don't like it ("B"), you would check the spaces like this:

QUESTION "A"					QUESTION "B"				
How has this aspect of your job changed in the past six months?					How do you feel about this change (or lack of change) in your job?				
much more now	more now	no change	less now	much less now	like a lot	like	don't care	dis-like	dis-like a lot

The hours I work on this job...

 |

[Faint, illegible text]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Faint, illegible text]

[Faint, illegible text]

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II 37 Considering everything, would you say you are now more satisfied or less satisfied with your job than you were six months ago?

- 1. Much more satisfied now
- 2. More satisfied now
- 3. No more, no less satisfied now
- 4. Less satisfied now
- 5. Much less satisfied now

As you may know, the company installed an IBM 650 computer in December last year. The following questions deal with the role of this computer as you see it and with your feelings about it.

II 38 What is your general feeling about the fact that the company has installed a computer?

- 1. I like it very much
- 2. I like it
- 3. It makes no difference to me
- 4. I dislike it
- 5. I dislike it very much
- 9. I have never given it a thought

II 39 What was the general effect of the changeover to the new computer?

- 4. It was very disrupting
- 3. It was quite disrupting
- 2. It was slightly disrupting
- 1. It was not disrupting at all
- 9. I have no idea

II 40 How long would you say it took you to get used to the change?

- 1. No more than one week
- 2. 1 week to 1 month
- 3. 1 month to 3 months
- 4. More than 3 months
- 5. Not really used to it yet
- 9. I was not affected at all

II 41 Considering everything, do you think the computer has been a good thing or a bad thing for the employees in ██████████ ?

- 1. A very good thing
- 2. A good thing
- 3. Neither a good thing, nor a bad thing
- 4. A bad thing
- 5. A very bad thing
- 9. I have no idea

11 37 Considering everything, would you say you are now more satisfied or less satisfied with your job than you were six months ago?

1. Much more satisfied now _____
 2. More satisfied now _____
 3. Not more, not less satisfied now _____
 4. Less satisfied now _____
 5. Much less satisfied now _____

As you may know, the company installed an IBM 709 computer in December 1958. The following questions deal with the way you feel about it. As you see it and with your feelings about it.

11 38 What is your general feeling about the computer? Has it satisfied a need?

1. I like it very much _____
 2. I like it _____
 3. It makes no difference to me _____
 4. I dislike it _____
 5. I dislike it very much _____
 6. I have never given it a thought _____

11 39 What was the general effect of the installation of the new computer?

1. It was very disappointing _____
 2. It was quite disappointing _____
 3. It was slightly disappointing _____
 4. It was not too disappointing _____
 5. I have no idea _____

11 40 How long would you say it took you to get used to the change?

1. No more than one week _____
 2. 1 week to 1 month _____
 3. 1 month to 3 months _____
 4. More than 3 months _____
 5. Not really used to it yet _____
 6. I was not affected at all _____

11 41 Considering everything, do you think the computer has been a good thing or a bad thing for the employees of [redacted]?

1. A very good thing _____
 2. A good thing _____
 3. Neither a good thing, nor a bad thing _____
 4. A bad thing _____
 5. A very bad thing _____
 6. I have no idea _____

II 42 In your opinion, would it be a good idea to use the computer more widely or less widely in this company than is now the case?

- 1. Much more widely than now
- 2. More widely than now
- 3. About the same as now
- 4. Less widely than now
- 5. Much less widely than now
- 8. I don't care
- 9. I don't know

II 43 What has happened to your job since last November?

- 1. I have been promoted
- 2. I have been transferred to a different job
- 3. I have kept my job, but the work has been greatly changed
- 4. I have kept my job, but the work has been noticeably changed
- 5. I have kept my job, and the work has been changed only slightly
- 6. I have kept my job, and the work has not changed
- 9. I was not employed here last November

II 44 How do you feel about the change (or lack of change) since last November?

- 1. I like it very much
- 2. I like it
- 3. It makes no difference to me
- 4. I dislike it
- 5. I dislike it very much
- 9. I was not employed here last November

II 45 Did the computer play any part in the change in your job since last November?

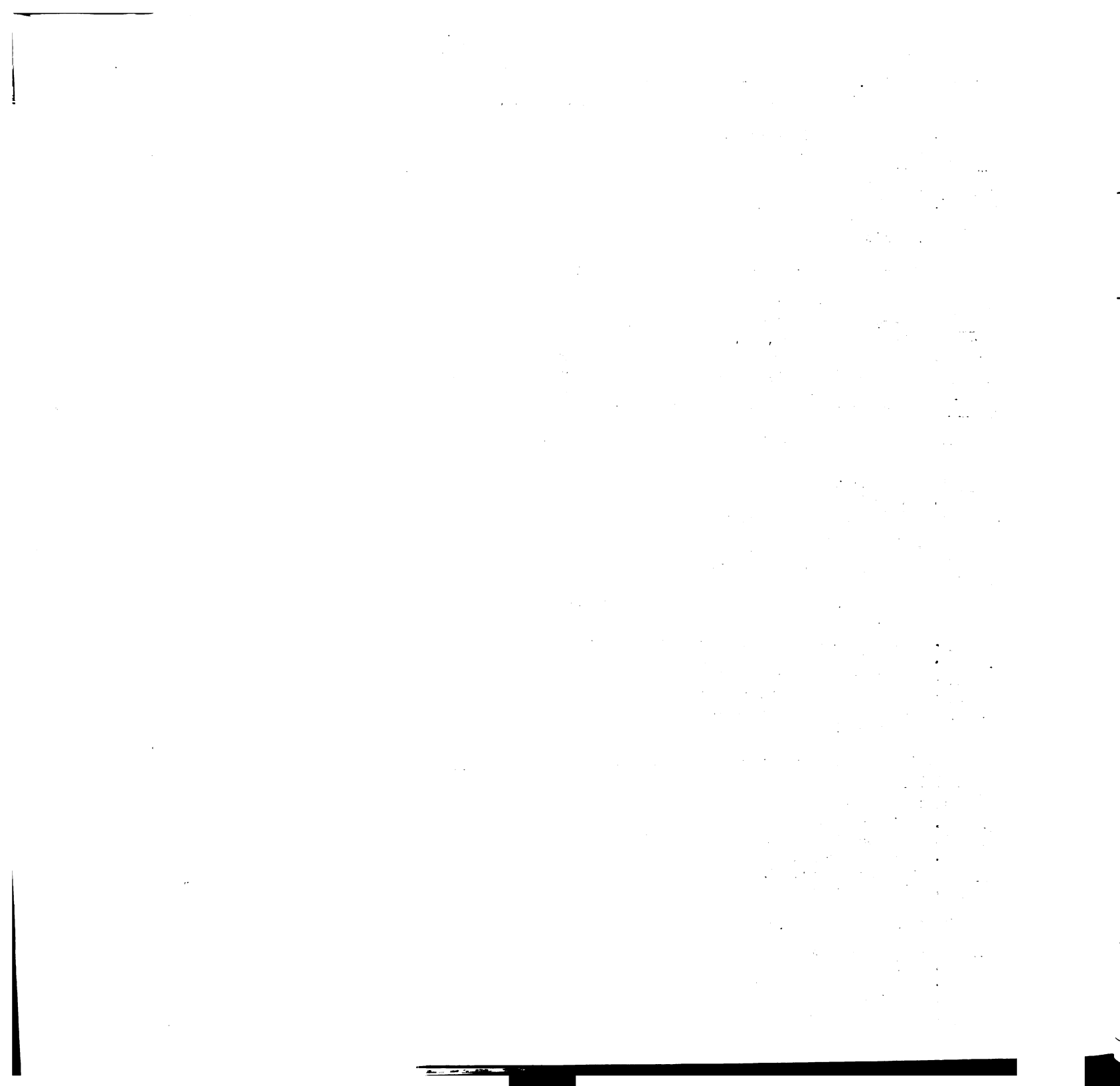
- 1. Yes, it was the main factor in the change
- 2. Yes, but it was a minor factor in the change
- 3. No, it was not a factor in the change
- 4. No, for there was no change
- 8. I was not employed here last November
- 9. I have no idea

II 46 Do you think that the computer will influence your job in the next year or two?

- 1. It is very likely
- 2. It is quite likely
- 3. It is possible, but not very likely
- 4. It is not very likely
- 5. It is not at all likely
- 9. I have no idea

II 47 How do you feel about this?

- 1. I like it very much
- 2. I like it
- 3. It makes no difference to me
- 4. I dislike it
- 5. I dislike it very much



1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that this is crucial for ensuring the integrity of the financial statements and for providing a clear audit trail. The text also mentions that proper record-keeping helps in identifying any discrepancies or errors early on, which can be corrected before they become more significant.

2. The second part of the document focuses on the role of internal controls in preventing fraud and misstatements. It outlines various control measures such as segregation of duties, authorization requirements, and regular reconciliations. The text stresses that these controls are essential for protecting the organization's assets and ensuring the reliability of its financial reporting.

3. The third part of the document addresses the importance of transparency and communication in financial reporting. It highlights the need for clear and concise disclosures that provide stakeholders with the information they need to make informed decisions. The text also discusses the role of management in ensuring that the financial statements are prepared in accordance with applicable accounting standards and regulations.

4. The fourth part of the document discusses the impact of technology on financial reporting. It notes that the use of accounting software and data analytics tools has significantly improved the efficiency and accuracy of financial reporting processes. However, it also warns that the reliance on technology requires organizations to stay updated on the latest developments and to implement robust cybersecurity measures to protect their data.

5. The fifth part of the document concludes by emphasizing the overall importance of a strong financial reporting system. It states that a well-designed system is essential for the long-term success and sustainability of any organization. The text encourages organizations to regularly review and update their financial reporting processes to ensure they remain effective and compliant with the latest requirements.

6. The sixth part of the document provides a summary of the key points discussed in the previous sections. It reiterates the importance of accurate record-keeping, internal controls, transparency, and the use of technology in financial reporting. The text also offers some final thoughts on the future of financial reporting, suggesting that continued innovation and collaboration will be key to addressing the challenges ahead.

7. The final part of the document is a concluding statement that expresses the author's confidence in the effectiveness of the proposed financial reporting system. It thanks the readers for their attention and encourages them to take the necessary steps to implement the recommendations outlined in the document.

Now we would like to know what you think will happen as a result of the computer. Below are several questions. For each question mark your answer in one of the columns "Yes", "Possibly", and "No", depending on your opinion.

		Yes	Possibly	No
II 62	Will the computer change the work methods in all parts of the company?			
II 63	Will the company be able to issue policies more quickly thanks to the computer?			
II 64	Will the computer soon be used for deciding which applications the company should accept and which it should reject?			
II 65	Will the computer endanger anybody's employment at [REDACTED]?			
II 66	Will a lot of people be able to use more of their skills as a result of the installation of the computer?			
II 67	Will the computer actually help increase employment at [REDACTED]?			

III 7 Of the information distributed about the IBM "650" computer I think I have received:

- 1. All of it
- 2. Most of it
- 3. Some of it
- 4. Only a little of it
- 5. None of it

III 10 Of the information I have received about the IBM "650" computer prior to its installation I felt it was necessary to pass along:

- 1. All of it
- 2. Most of it
- 3. Some parts of it
- 4. Only a little of it
- 5. None of it

III 11 I have discussed the IBM "650" computer with others:

- 1. Very often
- 2. Often
- 3. Sometimes
- 4. Not often
- 5. Never

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The following information was obtained from the files of the
Department of the Interior, Bureau of Land Management, on
the subject of the proposed acquisition of the land
described in the attached map.

The land is situated in the County of [redacted] State of [redacted].

The land is owned by [redacted] and is being offered for sale
to the United States Government.

The land is being offered for sale to the United States Government
for the purpose of [redacted].

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for the purpose of [redacted].

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for the purpose of [redacted].

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for the purpose of [redacted].

The land is being offered for sale to the United States Government
for the purpose of [redacted].

III 12 To what extent has the information you received from the company about the IBM "650" computer agreed with what actually took place?

- 1. It agreed very well
- 2. It agreed fairly well
- 3. It agreed in some ways and not in others
- 4. It disagreed somewhat
- 5. It disagreed very much

III 13 On the job that you have now, how much of your present work involves the use of office machines?

- 1. Almost all of it
- 2. A large part of it
- 3. Some of it
- 4. A small part of it
- 5. Almost none of it
- 9. Don't know

III 14 On the job that would be ideal for you, how much of your work would involve the use of office machines?

- 1. Almost all of it
- 2. A large part of it
- 3. Some of it
- 4. A small part of it
- 5. Almost none of it
- 9. Don't know

III 15 Do things here at work ever make you feel "jumpy" or nervous?

- 1. Never
- 2. Very seldom
- 3. Seldom
- 4. Sometimes
- 5. Quite often
- 6. Very often

III 16 The job that you would consider ideal for you would be one where the way you do your work:

- 1. Is always the same
- 2. Changes very little
- 3. Changes somewhat
- 4. Changes quite a bit
- 5. Changes a great deal

III 17 What are the things you like most about the way changes are handled in this company? _____

1. The first part of the document discusses the importance of maintaining accurate records of all transactions.

- It is essential to ensure that all entries are clearly dated and described.
- Regularly reconciling accounts helps to identify any discrepancies early on.
- Keeping receipts and supporting documents is crucial for verification.

2. The second section covers the various methods used to collect and analyze financial data.

- Different types of data sources can provide valuable insights into business performance.
- Utilizing advanced software tools can streamline the data collection process.
- Analyzing trends over time allows for more informed decision-making.

3. The third part of the document addresses the challenges associated with data management.

- Ensuring data security and privacy is a top priority in today's digital landscape.
- Maintaining data integrity and accuracy is essential for reliable analysis.
- Regular backups and disaster recovery plans are necessary to protect against data loss.

4. The final section discusses the future of data management and analysis.

- Emerging technologies like artificial intelligence and machine learning are revolutionizing data analysis.
- Cloud-based solutions offer greater flexibility and scalability for data storage and processing.
- Continuous learning and staying updated on industry trends are key to success in this field.

5. In conclusion, effective data management and analysis are critical for any organization looking to thrive in a competitive market.

- By implementing best practices and leveraging the latest technologies, businesses can gain a significant competitive edge.
- Investing in data management infrastructure and training is a long-term investment in success.
- Collaboration and communication between departments are essential for maximizing the value of data.

6. The document also includes a detailed appendix with further information on data management techniques.

7. This section provides a comprehensive overview of the various tools and software available for data management and analysis.

III 18

What are the things you like least about the way changes are handled in this company? _____

III 19

The main reason I work at my present job is to make money.

- _____ 1. I strongly agree
 _____ 2. I agree
 _____ 3. I neither agree, nor disagree
 _____ 4. I disagree
 _____ 5. I strongly disagree

III 20

If I received an inheritance so large that I did not have to work, I would still work at my present job.

- _____ 5. I strongly agree
 _____ 4. I agree
 _____ 3. I neither agree, nor disagree
 _____ 2. I disagree
 _____ 1. I strongly disagree

III 21

The things I do off the job are generally more interesting to me than the things I do while at work.

- _____ 1. I strongly agree
 _____ 2. I agree
 _____ 3. I neither agree, nor disagree
 _____ 4. I disagree
 _____ 5. I strongly disagree

III 22

It is more important to me that I do well at my work here than at anything else I do.

- _____ 5. I strongly agree
 _____ 4. I agree
 _____ 3. I neither agree, nor disagree
 _____ 2. I disagree
 _____ 1. I strongly disagree

III 23

I care more about what the people I work with think of me than I do about what most others think.

- _____ 5. I strongly agree
 _____ 4. I agree
 _____ 3. I neither agree, nor disagree
 _____ 2. I disagree
 _____ 1. I strongly disagree

III 24 I cannot really be happy unless I do very well at my job.

- 5. I strongly agree
- 4. I agree
- 3. I neither agree, nor disagree
- 2. I disagree
- 1. I strongly disagree

III 25 The general field of work I am in now is the kind I would prefer to stay in until I retire.

- 5. I strongly agree
- 4. I agree
- 3. I neither agree, nor disagree
- 2. I disagree
- 1. I strongly disagree

III 26 I would feel like a loafer if I did not have a job.

- 5. I strongly agree
- 4. I agree
- 3. I neither agree, nor disagree
- 2. I disagree
- 1. I strongly disagree

III 27 All things considered, how easy would it be for [REDACTED] to find someone else to do the job you are now doing?

- 1. Very difficult
- 2. Fairly difficult
- 3. A little bit difficult
- 4. Fairly easy
- 5. Very easy
- 9. Don't know

III 28 How many employees in the company think that your job is more desirable than their own jobs?

- 1. Almost all
- 2. Many
- 3. Some
- 4. Few
- 5. Almost none

III 29 How many supervisors in the company think that your job is more desirable than their own jobs?

- 1. Almost all
- 2. Many
- 3. Some
- 4. Few
- 5. Almost none

[Faint, illegible text, possibly bleed-through from the reverse side of the page]

[Redacted area]

[Redacted area]

III 30 As far as you can tell, what do your supervisors think about your work performance here at [REDACTED]?

1. They like it very much.
 2. They like it.
 3. They like most things about it, but there are some exceptions.
 4. There are several things about my work performance that they don't like.
 5. There are many things about my work performance that they don't like.
 9. Don't know.

III 31 How easy would it be for you to get a job as good as the one you now have at some other company?

1. Very easy
 2. Fairly easy
 3. A little bit difficult
 4. Fairly difficult
 5. Very difficult
 9. I don't know

III 32 How qualified do you feel you are to handle different jobs in this company?

1. Much more than most employees.
 2. More than most employees.
 3. About the same as most employees.
 4. Less than most employees.
 5. Much less than most employees.

III 33 Are you now taking any special training?

1. No, and I don't really plan to
 2. No, and I don't know whether I will or not
 3. No, but I plan to within 5 years
 4. Yes, training to help me on the job I'm on now
 5. Yes, training for a different job in this company
 6. Yes, training for a job elsewhere
 7. Yes, training to help me enter a profession or start my own business

III 34- When were you hired by [REDACTED]? Year _____ Month _____
35

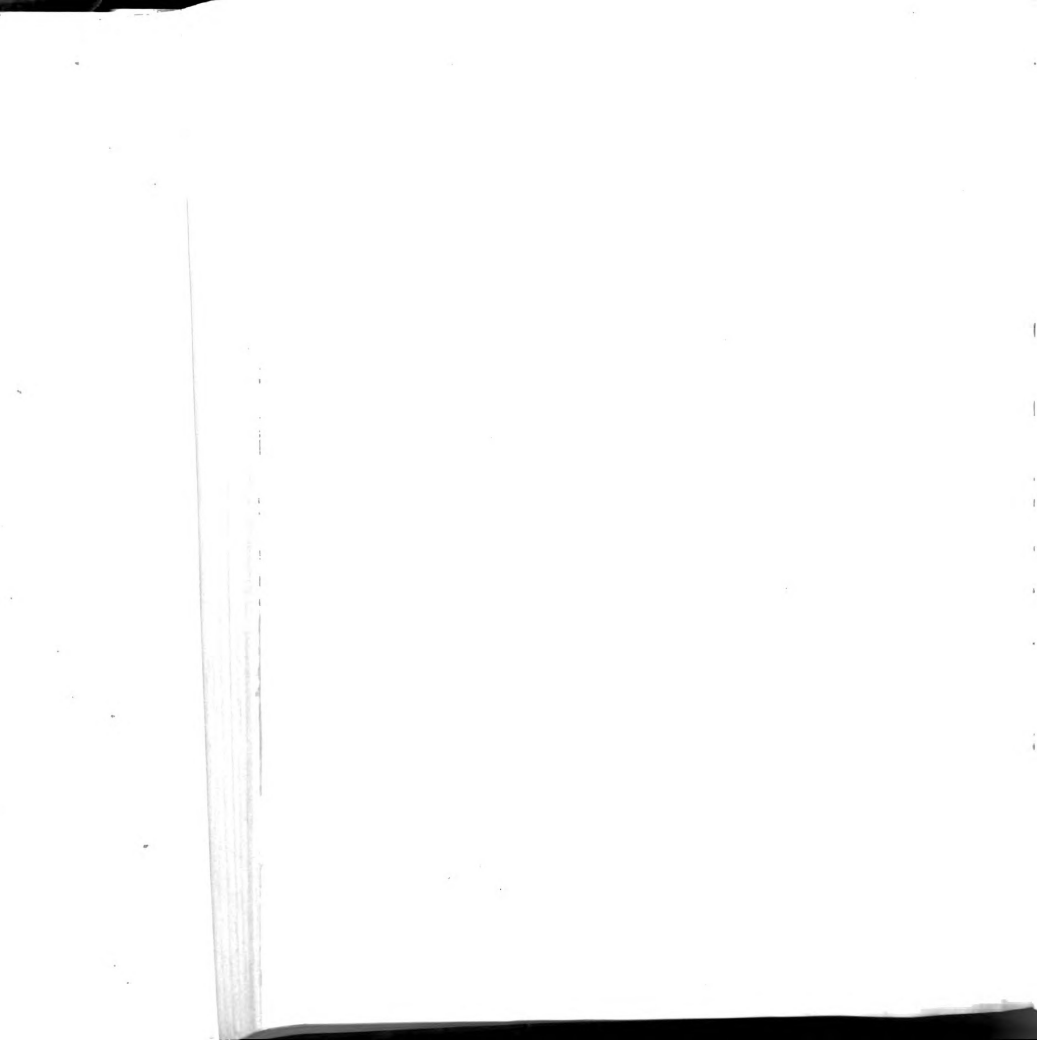
What is your present job title? (example: key-punch operator)

III 36- When did you start on your present job? Year _____ Month _____
37

What is your section and department? _____

- III 38-40 What is your supervisor's name? _____
- III 41-42 How many people do you supervise directly here at work?
_____ people
- III 43 Within the past 6 months have you tried to transfer from your present job to another job or department within the company?
Yes _____ No _____
- III 44 Within the past 6 months have you registered with any employment agency or applied for a job with any other organization?
Yes _____ No _____
- III 45 Are you the only wage earner in your household? Yes _____ No _____
- III 46 Are you the main wage earner in your household? Yes _____ No _____
- III 47 Could your household live adequately if you were not working?
Yes _____ No _____
- III 48 Is your household living adequately now? Yes _____ No _____
- III 49-50 Date of birth: Month _____ Day _____ Year _____
- III 51 Sex: Male _____ Female _____
- III 52 Marital status: Single _____ Married _____ Other _____
- III 53 How many years of school have you completed? Circle highest grade completed.
- | | | | | | | | | |
|---|---|---|----|----|----|-----------------|---------|------------------|
| 7 | 8 | 9 | 10 | 11 | 12 | Some
College | College | Graduate
Work |
|---|---|---|----|----|----|-----------------|---------|------------------|

Thank you for your cooperation. Now tear off the ballot at the bottom of the cover page of the questionnaire. Place the ballot in the "Ballot Box" and place the questionnaire in the box marked "Questionnaires".



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