THE EFFECTS OF CHOICE AND COMMITMENT ON ATTITUDE CHANGE AND PRODUCTIVITY GAIN

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ABSTRACT

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By

Gerald Winn Card

According to dissonance theory, variations in choice and/or commitment lead to variations in the arousal and magnitude of cognitive dissonance. While in most dissonance experiments subsequent pressures to reduce dissonance are used in predicting attitude change, this study predicted both attitude and behavioral change on the basis of hypothesized attempts at dissonance reduction. In addition, the choice and commitment variables were manipulated outside the laboratory in an industrial setting.

Following pretest attitude and productivity assessments, 46 female key-punch operators were exposed to departmental letters within the context of interviews introducing two methods of objectively evaluating individual productivity within their department. Half of the employees were allowed to choose between the two methods, while half were assigned one or the other. In addition, half of each of the above groups were told that they would learn their productivity

scores in private, while half were told that their scores would be presented in public.

The pretest productivity scores were presented a week later, followed immediately by an attitude posttest and a perceived choice assessment. All subjects were told at this time that productivity score presentations in the future would be based on actual productivity. Subsequent score presentations were made for productivity periods of two weeks and a calendar month.

Dependent variables in this study were (1) attitude change toward both the rating methods and the individual's job, and (2) productivity gain, for the two periods of productivity observation.

It was predicted that individuals in the Choice-Private condition would perceive greater "freedom of choice" in the experimental situation than would individuals in the other three conditions, and would, in turn, experience greater attitude change. The productivity gain hypothesis predicted that individuals in the public commitment conditions would increase productivity more than would individuals in the private commitment conditions.

While analysis of variance supported the perceived choice hypothesis, the attitude change hypothesis was not supported. The productivity gain hypothesis was supported for the first productivity period of two weeks, but not the second period of one month. Overall, or grand mean productivity for the second period of productivity observation,

however, was statistically significant when compared with the pretest productivity grand mean.

The failure to achieve significance with the attitude change inducements was viewed as a joint function of a "group retaliation" effect (wherein several subjects, influenced by one disgruntled subject's comments, reacted negatively against the experiment by checking the attitude posttest scales in a consistently negative manner), and a posttest subject deletion which resulted in identical pre- and posttest attitude scores for two experimental groups. These two factors seriously distorted the attitude change data, and made an unambiguous interpretation of the obtained results virtually impossible.

While the productivity increases during the two week productivity period were statistically significant as predicted, it appeared that a productivity ceiling had been attained within the public conditions, so that additional increases during the calendar month productivity period within the public conditions were unlikely to occur. Informal interview data also suggested that over the term of the experiment, interaction between experimental subjects resulted in the diffusion of performance information along lines other than those artificial channels of the experimental design. This would have tended to build motivational pressures withing the private conditions, thus leading to the productivity increases within the private conditions that vitiated the results for the calendar month productivity period.

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Gerald Winn Card

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CHAPTER I

INTRODUCTION

Lower level industrial employees normally have little voice in the organizational decision-making process. However, the employee does have attitudes and opinions about many changes in the organizational environment, especially as concern him personally; attitudes and opinions that may be crucial in the success or failure of organizational planning.

If we assume that many organizational changes are negatively evaluated by lower level employees when introduced, it would seem that several rather interesting predictions concerning both acceptance of the change and related behavior could be made based on Festinger's (1957) theory of cognitive dissonance. Dissonance theory is concerned with the antecedent conditions leading to the arousal of dissonance (a psychological tension with motivational characteristics), and various means of dissonance reduction. The most investigated variables relating to the arousal of dissonance have been choice and commitment, while the means of dissonance reduction most investigated has been attitude or opinion change.

Other means of dissonance reduction, however, including behavioral change, might also be predicted on the basis of attempts at dissonance reduction.

The dissonance formulation and the choice and commitment variables may have some very interesting "low cost" operational implications as concerns the introduction of organizational change. For example, dissonance theory predicts that the amount of choice an individual perceives in a choice between alternatives should influence subsequent evaluations of the alternatives involved in the choice. The question thus becomes whether the change situation can be structured as a choice situation. If so, perhaps one could predict greater liking for, or acceptance of, the change. On the basis of the dissonance research, one could also predict that the greater the commitment to information which is discrepant with one's self-concept, the greater the arousal of dissonance. To the extent that behavioral change can in fact be predicted on the basis of attempts at dissonance reduction, it would seem that if the unpleasant or discrepant information were concerned with individual performance or productivity, changes in performance or productivity could also be predicted.

The present study is an attempt to test choice and commitment hypotheses based on Festinger's theory of cognitive dissonance in the introduction of change in performance evaluation in a highly programmed industrial department. The

experimental setting is as follows: two rating methods designed to objectively evaluate individual productivity are to be introduced into the key-punch section of a large corporation's data processing department. Half of the departmental employees will be given a choice between the two methods; i.e., will be allowed to choose the method by which they will be evaluated, while half will be assigned one or the other methods. In addition, half of each of these two groups will learn their subsequent productivity scores in private, half in public.

The dependent variables in this study are (1) attitude change toward the rating methods and the individual's job, and (2) productivity gain. The independent variables are choice and commitment, operationalized as follows:

(1) Choice-Private: Presentation of a departmental letter within an interview introducing the rating methods, with employees in this condition being allowed to choose between the two methods, and their subsequent performance scores to be presented in private.

(2) Choice-Public: Same as (1) above, with the exception that the score presentations are to be made in public.

(3) Denied Choice-Private: Presentation of a departmental letter within an interview introducing the two rating methods, but assigning one of them, with subsequent performance scores to be presented in private.

(4) Denied Choice-Public: Same as (3) above, with the exception that subsequent scores are to be presented in public.

It is hypothesized that attitude change toward both the rating methods and the individual's job will vary directly with the subjective perception of choice in the situation, with the greater increases occurring within the Choice-Private condition (condition 1, above), while productivity gain will vary directly with the publicness of subsequent score presentations (commitment), with the greater increases occurring within the public score presentation conditions (conditions 2 and 4, above).

Previous Research

According to Festinger (1957), dissonance is the existence of non-fitting relations between cognitive elements, which he describes as "any knowledge, opinion, or belief about the environment, about oneself, or about one's behavior (p. 3)." Specifically, "two elements are in a dissonant relation if, considering these two alone, the obverse of one element would follow from the other (p. 13)." Two basic hypotheses are offered:

> The existence of dissonance, being psychologically uncomfortable, will motivate the individual to try to reduce dissonance and achieve consonance.
>
> When dissonance is present, in addition to trying to reduce it, the person will actively avoid situations and information which would likely increase the dissonance (p. 3).

Much of the dissonance research may be viewed from the standpoint of the effects of choice on attitude change. The dissonance research generally supports the notion that the

amount of choice an individual perceives in a decision between two or more alternatives should influence subsequent evaluations of the choice alternative.

A variable closely related to choice in the dissonance research is that of commitment. As Brehm and Cohen (1962) have pointed out, most of the empirical investigations have been concerned with the "special case" of commitment. However, as defined by Brehm and Cohen, commitment appears to be more or less synonomous with choice or decision: "a person is committed when he has decided to do or not to do a certain thing, when he has chosen one (or more) alternatives and thereby rejected one (or more) alternatives, when he actively engages in a given behavior or has engaged in a given behavior (Brehm and Cohen, 1962, p. 7)."

Commitment has not, however, been used extensively in the dissonance research to describe or explain a behavioral process. Perhaps the most parsimonious approach to reviewing the relevant dissonance literature is to subsume commitment under the rubric of choice. For the purposes of this review, it will be assumed that once a choice or decision has been made, commitment occurs, and one may expect to see manifestations of attempts at dissonance reduction. While such an approach is not without its negative aspects (see, for example, Deutsch and Krauss, 1965, pp. 73-75), it would appear to be consistent with the manner in which commitment has been treated in the literature.

For the most part, the dissonance research supports the notion that the greater the commitment to unpleasant or discrepant information or behavior, the greater the arousal of cognitive dissonance, and the greater the consequent attempts at dissonance reduction.

Choice and commitment, then, may be viewed as very important variables in the dissonance research. As the hypotheses of this study are directly concerned with the choice and commitment variables, the review of the research evidence will center around the effects of choice and the effects of commitment in various dissonance producing situations.

Cohen, Terry, and Jones (1959) tested a choice in exposure hypothesis by asking male undergraduates in a high choice condition three times if they wished to hear the experimentor read a counter-attitudinal message to them concerning the advisability of young men marrying before the age of 23. In a low choice condition, subjects were merely told that the experimentor was going to read the contrary information to them. The results of this experiment generally indicated that among extreme subjects, high choice produced greater change toward the position advocated in the communication than did low choice. Choice, however, had little effect on those who were initially moderate toward the issue.

An experiment by Davis and Jones (1960) suggests that a choice or commitment must be perceived as relatively irrevocable before dissonance reduction and attitude change

occurs. In this experiment, half of the male subjects were assigned the task of reading an unfavorable evaluation to an unseen stimulus person, while half were persuaded to do so (i.e., they could give either a positive or negative evaluation, but what the experimentor really needed was a negative evaluation). In addition, within each of these two groups, half of the subjects were told that immediately following the reading they would be allowed to meet the recipient and be able to explain why it had been given. The rest were told that there would be no opportunity to retract their statements. As predicted, the amount of negative change toward the message recipient was greater in the choice-irrevocable condition than in the other three conditions. However, as nearly one-quarter (12 of 52) of the subjects in this experiment were eliminated for various reasons, the obtained results should probably be accepted with some reservation.

The following two studies investigated choice under the rubric of "justification for compliance." The dissonance prediction would be that the greater the justification used to secure compliance, the less the arousal of dissonance and consequent attitude change. Cohen, Brehm, and Fleming (1958) operationalized high justification (low choice) by giving 92 male undergraduate subjects several reasons why they should write a counter-attitudinal essay (e.g., it would help the experimentor, and the results of the survey would be of interest to both social scientists and the university authorities). In the low justification condition (high choice),

subjects were given only the necessary instructions. While an analysis using all subjects did not result in significantly different attitude change in the two conditions, when those subjects with original extreme attitudes were deleted from analysis and the hypothesis retested, the difference level reached the .07 level. The authors report that the failure to achieve significance may have been due to the fact that all subjects wrote essays, so that there was a generally compelling force to comply in all conditions.

Rabbie, Brehm, and Cohen (1959) manipulated the independent variable in much the same manner as did the previous study. In the high justification condition, the writing of a counter-attitudinal essay concerning the elimination of intercollegiate athletics was strongly justified by the experimentor. In the low justification condition, the experimentor barely justified writing the essay. Subjects in the high justification condition reported significantly greater feelings of obligation (less choice) than did subjects in the low justification condition (more choice). When attitudes were measured immediately after the decision to take the discrepant position, as well as after the essay had been written, subjects in the low justification (high choice) condition showed significantly more change than did subjects in the high justification (low choice) condition. The issue under consideration in this study was apparently highly salient, as 46 percent of the subjects contacted refused to

write the counter-attitudinal essay. Unfortunately, the authors report no data for these subjects.

External justification may take many forms. The following two studies successfully manipulated the amount of monetary reward in two forced compliance situations as a determinant of subsequent attitude change. Festinger and Carlsmith (1959) tested the hypothesis that "the greater the pressure used to elicit overt behavior, the weaker will be the tendency for the individual to change his opinion to bring it into correspondence with what he has said or done." Pressure was manipulated by varying the amount of reward offered to male subjects to take part in a very boring and tedious task of an hour's duration, and then tell the next experimental subject (a confederate of the experimentor) that the task was, in fact, enjoyable. Subjects in one condition were given twenty dollars as a reward (low choice), while subjects in another condition were given one dollar (high choice). As predicted, subjects in the high choice (one dollar) condition rated the experimental tasks significantly more enjoyable than did those subjects in both a control group and the low choice (twenty dollar) condition.

Cohen (1959) obtained similar results in an experiment using rewards graduated from $.50, $1.00, $5.00, and $10.00, for writing an essay contrary to private views on a current campus issue. The results of this experiment, as in the Festinger and Carlsmith study, showed a consistent inverse

relationship between the amount of reward and attitude change. In addition, a measure of perceived volition obtained by Cohen generally indicated that volition decreased as the inducing force increased; although there was a slight reversal in the high dissonance ($.50) condition.

As convincing as these two studies appear, both have been recently re-examined due to possible alternative explanations for the results. Janis and Gilmore (1965) suggest that an "incentive" effect might have accounted for the results of the Festinger and Carlsmith study, while Rosenberg (1965) posits that Cohen's results were artifactual, and due to negative affect and evaluation apprehension. However, the "replications" of these latter experimentors are not exact replications, and so the theoretic controversy continues (see, for example, McGuire, 1966).

The following two studies investigated the choice variable in a rather different context; that of selecting between relatively attractive articles as payment for participating in what might be termed "consumer research." Brehm (1956) had 225 female college students rate eight $15 to $30 manufactured articles on an eight-point scale as to desirability. Choice in this study was manipulated by allowing certain subjects to choose between a specified two of the articles with the impression that they could keep the article chosen as payment for participating in the research. In a no-choice, or "gift" condition, the experimentor chose an

article previously rated as highly desirable by the subject (either 5, 6, or 7 on the eight-point scale) and gave it to her as a gift.

Attitude change was measured by comparing pre- to posttest desirability rating changes for both chosen and unchosen articles. In support of the revaluation of alternatives hypothesis (one of three tested), the results indicated that chosen articles increased in desirability from the pre- to posttest period, while similar articles in the no-choice or "gift" condition did not.

Brehm and Cohen (1959) tested the hypothesis that revaluation of alternatives following choice will increase with an increase in the number and qualitative dissimilarity of the choice alternatives. Two hundred and three sixth-grade children rated 16 toys on the basis of liking both before and after being allowed to choose one toy from a selected group as a reward for participating in the research. Half chose from two toys, half from four. In addition, half of each of these groups chose from qualitatively similar toys, half from dissimilar toys. The authors report that significantly greater attitude change toward the chosen alternative occurred in the four alternative than in the two alternative condition, and in the dissimilar rather than the similar condition. In general, chosen toys became more liked, unchosen toys became less liked.

While both of these studies suggest that postdecisional reorganization of choice alternatives can occur, a large

number of subjects were deleted from the overall analyses in each study. In the Brehm study, for example, 48 subjects reversed their choice from pre- to posttest, and an additional 30 subjects' ratings were such that the pre-determined dissonance conditions could not be created. In the Brehm and Cohen study, 130 of the total 203 subjects were deleted from analysis for various reasons! Subject loss in this experiment becomes crucial when the authors state in a footnote that for the entire sample, only the similar-dissimilar manipulation had any effect. Due to such inordinately large subject losses, the results of these experiments should probably be viewed with some apprehension, especially those conclusions dealing with other than simple revaluation of alternatives following choice.

In another "free choice" experiment, Deutsch, Krauss, and Rosenau (1962) tested the hypothesis that "a chooser will experience post-decisional dissonance only when he perceives his choice in a given situation to be inconsistent with the conception of himself which he tries to maintain (for himself or for others) in that situation." Their subjects, 58 paid undergraduate volunteers, rated six bread spreads on a nine-point scale in terms of flavor and overall preference. Two spreads that had been rated close to midscale were then selected for each subject and he was asked to choose one of the two as a gift. Half of the high self-involvement group was told prior to choosing that a person's ability to judge

subtle differences in the quality of foods was closely related with leadership aptitude, executive potential, and artistic judgment. The other half of the high self-involvement group first made their choices and then received the above inducement. A low self-involvement group, on the other hand, received no inducement. All subjects then re-rated all six spreads.

The results of this study indicated that the amount of change toward the chosen spread, from pretest to posttest, was significantly greater for the high self-involvement group than for the low self-involvement group in terms of flavor ratings, but not for overall preference ratings. The two high self-involvement groups (inducement before-choice and inducement after-choice) did not differ significantly. As no subjects were eliminated from this study, the dissonance theory prediction that revaluation of choice alternatives occurs following a choice or decision receives some fairly strong support.

The fact that only the flavor ratings and not the overall preference ratings increased from pre- to posttest would appear to be directly related to the involvement inducement in the above study. As the choice involved appears to have been rather trivial, it would seem that only the involvement inducement made the choice sufficiently important so that rating changes occurred.

The importance of a decision or commitment would appear to be directly related to the magnitude of the dissonance

aroused in the situation. Festinger (1957) has advanced an hypothesis concerning this relationship: "the magnitude of the dissonance . . . which exists between two cognitive elements will be a direct function of the importance of the two elements (Festinger, 1957, p. 262)." Thus, variations in personal involvement should have implications for both the arousal and magnitude of cognitive dissonance, as well as for attempts at dissonance reduction. The remaining studies to be reviewed are all concerned with rather direct manipulations of importance or involvement. And, while there may or may not have been a meaningful prior choice manipulation, it is the variation in commitment that is of major importance.

Zimbardo (1960) had female college students appear in friendship pairs for a study dealing with how friends diagnose and evaluate social issues. All subjects were asked to read a case study on juvenile delinquency and then determine the locus of the blame for the crime described in the study. Half of the subjects were told that it would be impossible to learn anything from their reactions to the case (low involvement), while half were told that their reactions to the case would indicate their basic social values, personalities, and outlook on important life problems (high involvement).

After having written their opinions of the case study, subjects were asked to judge delinquents from a group of eight photographs; a task which would measure their "judgmental and perceptual" abilities. Each subject was then told

that her friend had rated all eight of the pictures correctly, but that she had rated only five of the eight correctly. Subjects were then told of their friend's ratings of the case study, under either high or low discrepancy conditions between friend and subject.

The results of this study indicated that the high self-involvement group (high commitment), which reported stronger feelings of involvement than did the low self-involvement group (lower commitment), showed significantly more change toward the positions of their friends than did the low self-involvement group.

Aronson and Mills (1959) induced dissonance in female subjects by requiring them to take an "embarrassment" test in order to join a series of group discussions on the psychology of sex for which they had volunteered. In a mild initiation condition (low involvement, hence low dissonance), subjects were required to read five rather mild sex related words to the experimentor; in a severe initiation condition (high involvement, hence high dissonance), subjects were required to read a list of twelve obscene words and two descriptions of sexual activity to the experimentor; while, in a control condition, subjects were merely told that they would become members of the discussion group. Following these "embarrassment" tests, all subjects listened to a very boring tape recorded discussion on animal sexual behavior by the group they were supposed to join. After hearing the tape, subjects were asked to indicate both how good

they thought the discussion group was, and how much they liked the members of the group. The results of this experiment indicated that the more embarrassing or painful the test required to join the group, the more the discussion group and the participants were rated more favorably.

Brehm (1960) had subjects fill out a questionnaire estimating the vitamin content and liking for a disliked vegetable, and then meet with the experimentor to eat a portion of the vegetable. Commitment in this study was varied by having the subject eat either a little or a lot of the vegetable. After eating, subjects read a report giving ficticious information either supporting or not supporting particular attributes of the vegetable eaten. After reading, a questionnaire was again administered. High eating (high commitment) subjects were significantly different from low eating (low commitment) subjects in mean change of estimation of vitamin content of the vegetable. Liking for the vegetable, however, increased to approximately the same extent for both high and low commitment subjects.

Cohen and Brehm (reported in Brehm and Cohen, 1962, pp. 206-210) report on yet another experiment varying the amount of personal involvement. Thirty undergraduate fraternity pledges were asked by their pledge-masters to report individually for a short project taking some fifteen to twenty minutes. The experimentor, a professor not connected with the fraternities, demanded, however, that they sign up

to copy random numbers for from three to four hours. Three conditions of coercion were used: high, where subjects were threatened with strong efforts to keep them out of their fraternity houses; low, where they were threatened with extra hours of pledge duty; and control, where the subjects were simply asked to cooperate. After this manipulation, each subject was given a schedule sheet on which to indicate his "free hours."

Perceptions of the coercive force, perceived choice in participation, evaluation of the number copying task, and amount of personal annoyance were measured in a questionnaire given immediately after the above commitment to participate was obtained. The high coercion group felt that they had been most strongly threatened, had the greatest amount of choice or volition, and were most strongly disposed toward the task. On the basis of other dissonance research, however, one would predict that favorability toward the task should <u>decrease</u> as threat is increased. The authors conclude that the increase in perceived choice accompanying increased threat or coercion was due to the perception of the threat involved as being illegitimate, thus demonstrating, supposedly, that volition in itself is a key determinant of the magnitude of the dissonance aroused.

One might ask, however, if the illegitimate coercion in this experiment was conceived before the experimental manipulations took place. If so, then perhaps the authors'

position is valid. If not, then the experiment demonstrates that certain ancillary manipulations do not always have their desired effect. However, as the group perceiving the greatest freedom of choice also was most favorably disposed toward the number writing task, this study does provide support for the effects of choice and commitment on dissonance arousal and reduction.

An experiment by Brehm (1959) investigated the effects of a fait accompli on attitude change. Brehm had subjects (eighth-grade students) rate 34 vegetables as to liking, and then three weeks later, offered them two movie tickets or two phonograph records of their choice if they would eat a portion of a disliked vegetable. Subjects were free to refuse if they chose. In the low consequence condition, the subject merely ate the vegetable and then filled out the questionnaire again. In the high consequence condition, when the subject had nearly finished eating the vegetable, he was told that his parents would receive a letter from the experimentor informing them of the subject's behavior; the implication being that the subject would have to eat more of the disliked vegetable at home.

Favorable attitude change toward the previously disliked vegetable was significantly greater for the high consequence group than for the low consequence group. Apparently the parents' knowledge of the subject's discrepant behavior increased the need to justify having been persuaded

to eat the vegetable for those in the high consequence condition.

The question of "who knows," or the publicness of behavior or commitment has not received a great deal of attention in the dissonance research. One could argue, perhaps, that all behavior in the experimental setting is somewhat public, as the experimentor is normally present and aware of what has taken place. While perhaps a moot point, one could additionally argue that observation by the experimentor may be a critical factor in understanding many of the "non-obvious" dissonance theory results.

If we assume that others' knowledge of one's discrepant behavior should enter as a cognition against that behavior, particularly when such behavior reflects adversely on one's self-image, it would follow from dissonance theory that the arousal of dissonance should be greater under public rather than private conditions. In this vein, Cohen, Brehm, and Latane (1959), replicating an earlier (1957) study by Festinger, varied the publicity attached to subjects' performance in a gambling experiment. Public condition subjects were told that both their choice of sides and their winnings in the low stake card game would be published in the school newspaper. Private condition subjects were told that their choice of sides and winnings would be kept confidential. As in the Festinger study, the dependent variable was the amount of time, following the twelfth hand, spent looking at a graph supposedly showing the true probabilities of winning.

The graph, a different one for each side, gave the false information that the chosen side was the losing side. It was assumed that small winners and losers would spend only a moderate amount of time viewing the graph, as it would confirm their behavior, while heavy losers were expected to ignore the graph, as it would show that they had been wrong in their choice of sides in the game. The data generally confirm this, with tendencies toward selective exposure and avoidance most pronounced under public rather than private conditions.

Chapanis and Chapanis (1964) direct a number of criticisms toward the Festinger experiment and the Cohen et al. replication. One criticism has to do with what they consider to be Festinger's overly elaborate interpretations of his results. According to the Chapanis's, had Festinger's pattern of results been exactly reversed, his explanations would still apply!

Their most important criticism, however, is that the two experiments were not so much experiments in postdecision processes as they were experiments in predecision processes. Subjects had been told that they could change sides and were, in fact, given an opportunity to do so when presented with the graphs. While Festinger and Cohen et al. reported that many subjects did announce at this time their decision to change sides, the Chapanis's claim that what was not reported was the number of subjects who looked at the graphs

in order to reach a decision whether or not it would be more profitable to change sides. The Chapanis's conclude: "taking all of these factors into consideration, we are forced to conclude that . . . the successful replication of the experiment suggests--not that the cognitive dissonance formulations are valid, but only that the results of experiments of this type are reproducible (Chapanis and Chapanis, 1964, pp. 10-11)."

The criticisms advanced by the Chapanis's are well taken. However, as they point out, Festinger's explanations are both elaborate and persuasive. Perhaps on this basis, plus admiration for Festinger's rationale, the Festinger experiment and the Cohen, Brehm, and Latane replication are included at this review as offering at least general support for the dissonance theory prediction tested.

The above two experiments, as well as the Brehm (1959) study could additionally be criticized for failing to demonstrate that choice had any effect at all! There was no variation in choice in the Brehm study (i.e., all subjects complied), and the Festinger and Cohen et al. studies can be understood on other than a "choice of sides" basis. Given the importance variation in the Brehm study (eating more of the disliked vegetable at home) and the Cohen, Brehm, and Latane study (publicity), one could speculate that greater commitment alone would account for the obtained results; perhaps irrespective of there having been a prior choice manipulation.

While many of the individual dissonance experiments have been criticized for a number of reasons, taken as a whole, the evidence from these experiments generally support the notion that variations in choice and/or commitment lead to variations in the arousal and magnitude of cognitive dissonance. And, while most of the dissonance experiments have dealt with attitude change as the dependent variable, other means of dissonance reduction, including behavioral change, could certainly also be predicted on the basis of hypothesized attempts at dissonance reduction.

Rationale and Hypotheses

The experimental setting of this study is as follows: Objective productivity rating methods are to be introduced into the key-punch section of a large corporation's data processing department. One theoretic question of interest is whether choosing between the rating methods has an effect on favorable evaluation of the rating methods or the individual's job? On the basis of the research cited, the attitudinal hypothesis of this study is that it does. More specifically, it is hypothesized that:

> H_1: Individuals making a decision between two productivity rating methods with subsequent private score presentations will perceive greater freedom of choice than either those making a similar decision with subsequent public score presentations, or those who are assigned a rating method; regardless of the type of score presentation (C Pr > C Pb, DC Pr, DC Pb).

As concerns the subjective perception of choice, the literature is fairly explicit. If choice is denied, or no

choice is made, there should be little or no perception of choice. On the other hand, of those who do choose between rating methods, only those with subsequent private score presentations should perceive themselves as having much choice in the introduction of the methods. This would be due to the relative lack of external pressures within the private score presentation conditions. Owing to the external pressures involved in the public score presentation conditions, those making a decision with subsequent public score presentations should feel that the choice is less theirs to make, and due more to chance factors.

The second attitudinal hypothesis to be tested is:

H_2: Individuals making a decision between two productivity rating methods with subsequent private score presentations should change more favorably in attitude toward both the rating methods and their jobs than either those making a similar decision with public score presentations, or those who are assigned a rating method; regardless of the type of score presentation (C Pr > C Pb, DC Pr, PC Pb).

The basis for this hypothesis is the dissonance theory prediction that both arousal of dissonance and subsequent attitude change are directly related to perceived choice. As the Choice-Private group is expected to perceive the greatest choice in the experimental situation, this group is also expected to experience the greatest attitude change.

The productivity gain hypothesis to be tested is as follows:

H_3: Individuals who learn their performance scores under public conditions will increase

productivity more than those who learn their performance scores under private conditions (C Pb and DC Pb > C Pr and DC Pr).

Objectively, the performance information to be presented is the same for all experimental groups. That is, having randomized subjects to treatments, one's best bet would be that the groups are equal (within random error expectations) on the variable under consideration. It is difficult to imagine that a prior choice of rating methods would have much effect on subsequent productivity increases. The type of commitment made, however, imposes a subjectivity bias on the performance information. In dissonance theory terms, others' knowledge of one's possible poor performance should enter as a cognition against that level of performance, and one should be motivated to reduce this dissonance by increasing productivity. In addition, learning the scores of others' should present a standard of comparison for evaluating one's own performance in the public score presentation conditions. Of course, these factors do not apply in the private score presentation conditions.

A key factor behind this hypothesis was the finding by this investigator during the pretest productivity assessments that nearly all employees exceeded the productivity levels that IBM Corporation and local management regarded as "good" performance by an employee. In fact, the productivity levels considered "good" were substantially below the departmental individual productivity means or averages! Thus, as employee performance had been reinforced at a very

low level in the past, the performance feedback based on actual departmental performance should be viewed as extremely discrepant by most employees. And, of course, learning one's performance score in the presence of others should accentuate the impact of this information.

There is a possibility that the productivity gain hypothesis may appear to be inconsistent with the dissonance research cited. It was stated earlier that commitment has normally been subsumed under the rubric of choice in the literature, and there is thus little direct evidence for the efficacy of commitment on the arousal of cognitive dissonance. Yet, in the productivity gain hypothesis, no mention is made of the choice variable as being important. Is this consistent with the theory and research?

The score presentation conditions in the present study can easily be viewed as examples of involuntary exposure situations, in which case, one could evoke Festinger's failure to mention choice as necessary for the arousal of dissonance in the accidental or involuntary exposure situation. On the other hand, Brehm and Cohen maintain that some prior volition is necessary before the involuntary exposure situation is viewed as a dissonance producing situation. The position taken, which is consistent with the Brehm and Cohen view, is that the employees have made a relevant choice in having chosen to produce at a certain level in the past. Thus, past volition could have prevented the unpleasant consequences viewed as an integral part of the feedback conditions.

To test the above hypotheses, four ways of presenting departmental letters within individual interviews were developed:

(1) Choice-Private: Presentation of a message offering a choice between two objective productivity rating methods, with the employee's subsequent scores under the chosen method to be presented in private.

(2) Choice-Public: Same as (1) above, with the exception that the employee's subsequent scores under the chosen method would be presented in public.

(3) Denied Choice-Private: Presentation of a message mentioning both methods, but assigning one of them, with the presentation of the employee's subsequent scores to be in private.

(4) Denied Choice-Public: Same as (3) above, with the exception that the employee's subsequent scores would be presented in public.

If the choice and commitment inducements of this study are successful, one would predict:

> The Choice-Private group should perceive greater "freedom of choice" than the other three experimental groups in the introduction of the rating methods, as indexed by the average sum of scores on a seven-point perceived choice scale (Hypothesis 1).
>
> The perceived choice differences in Hypothesis 1, above, should be reflected in attitudinal differences; i.e., the pre- to posttest differences in the sum of scores on four seven-point semantic differential scales for the Choice-Private group should be statistically greater than for any of the other three groups (Hypothesis 2).

The public score presentation groups should increase productivity more than the private score presentation groups, as determined by a comparison of productivity difference scores at the end of each period of productivity observation (Hypothesis 3).

CHAPTER II

DESIGN AND PROCEDURES

This study was designed to assess (1) change in attitude toward two job related concepts and (2) productivity gain, under four conditions of choice and commitment. A two-by-two factorial design was used in this investigation, with the hypotheses being: (1) attitude change would vary directly with the amount of choice perceived by subjects in a decision between two productivity rating methods, while (2) productivity gain would vary directly with the publicness of subsequent score presentations (commitment) under the applicable rating method.

A five phase before-after design was used. In Phase I (pretest), subjects' attitudes toward two experimental concepts were assessed, while independently, pretest productivity figures were extracted from extant records and used to compute departmental and individual productivity norms.

Phase II took place eight weeks later, and consisted of exposing each subject to both an interview and a departmental letter from local management introducing two methods of objectively rating employee productivity within the

department, according to an experimental design either offering or denying a choice between the two methods. Denial of choice was operationalized by mentioning both methods, but assigning one of them. The presentation of subsequent productivity scores earned under the applicable method was to be made either publicly or privately.

Phase III occurred one week after the Phase II manipulations, and consisted of informing each subject of her initial Phase I productivity score according to the experimental design of public or private score presentation. Immediately following the score presentations, subjects' attitudes were re-assessed (thus permitting pre- to posttest comparisons for purposes of statistical analysis) and a measure of the amount of choice perceived by each subject was obtained. Following the posttest attitude assessment, all subjects were told that the next presentation of productivity scores would occur within three weeks, based on productivity for the next two weeks. The scores for this two-week productivity period are termed Phase IV scores in this study.

Three weeks later, all subjects were informed of their Phase IV productivity scores, either privately or publicly as dictated by the experimental design. Following this score presentation, all subjects were told that future productivity scores would be presented monthly, based on actual monthly productivity. While a productivity score for the following month was calculated for each subject, no additional

experimental manipulations were performed. This monthly score is termed the Phase V score in this study.

Independent Variables

There were two independent variables in this study. The first was the amount of choice offered in a decision between two objective productivity rating methods, the second was publicness of subsequent productivity score presentations (commitment). Experimental messages were presented to subjects as departmental letters during individual interviews designed to introduce the new employee productivity rating methods. The states of the variables were operationalized by treatment group as follows:

(1) Choice-Public: After a brief introduction to the two rating methods, the subjects were instructed to:

"Please check which one of the two scores you would prefer to be rated with:

A. Efficiency Score ____.
B. Effective Productivity Score ____.

In the interests of time, you will be told of your initial score in a small group of from three to six other employees, early next week."

(2) Choice-Private: Same as (1) above, with the exception that the score presentation line read:

"You will be told of your initial score, in private, early next week."

(3) Denied Choice-Private: After the paragraph introducing the two methods:

"You will be rated with the _____ score, and will be told of your initial score, in private, early next week."

(4) Denied Choice-Public: Same as (3) above, with the exception that the score presentation line read:

"In the interests of time, you will be told of your initial score in a small group of from three to six other employees, early next week."

To check on the success of the experimental variations, a measure of the level of perceived choice was taken at the time of the attitudinal posttest (Phase III):

Check on the following scale how much choice you feel you had in what you did here today:

Little_____:_____:_____:_____:
extremely quite slightly neither

_____:_____:_____:Much
slightly quite extremely

Dependent Variables

The first of two dependent variables in this study was attitude change toward both the productivity rating methods and the individual's job. Following Osgood, Suci, and Tannenbaum (1957), attitude was considered a "learned implicit response which is essentially bipolar, varies in its intensity, and mediates evaluative behavior." Operationally, an individual's attitude toward a concept was reflected by the way a set of evaluative semantic differential scales were marked with respect to it.

Attitude was indexed by the sum of scores on four (0-6) seven-point scales used to judge each concept: Good-Bad,

Pleasant-Unpleasant, Worthless-Valuable, and Nice-Awful. In the work of Osgood et al. (1957), these scales consistently carried high and relatively unambiguous loadings on the evaluative factor.

Attitude change for a single concept was determined by taking the difference between the pretest (Phase I) and posttest (Phase III) scores and signing it positively if the change was in a positive direction and negatively if not, and then using this score as a derived raw score for the attitude change analysis of variance.

The second dependent variable in this study was productivity change, over two observational periods (Phase IV minus Phase I and Phase V minus Phase I). Productivity change scores were computed for each individual as deviations from the individual's pretest productivity score. At each computational period (i.e., Phase IV and Phase V), each subject's new productivity figure was used to compute a standard score, or *z* score, based on deviation from the departmental pretest norm. This score was then subtracted from the individual's pretest *z* score, leaving a remainder expressed as a *z* score difference. These difference scores were then used for the analyses of variance.

The Sample

The day and afternoon shifts in Oldsmobile's data processing key-punch section formed the sample for this study. The subjects were all females, ranging from eighteen to about

fifty years of age. While there were 62 subjects available for the study, ten either failed to check the pretest semantic differential scales properly or were not identifiable from the pretest instrument, and six were absent at the time of the posttest attitude assessment. This left 46 subjects at the time of the attitude posttest, from which six were deleted to equalize cell n's at ten subjects per cell for the attitude change analyses of variance. The four cell n's before the subject deletion were 13, 12, 11, and ten respectively. Three additional subjects were absent for a significant period of time during some part of the productivity change portion of the study, thus leaving 37 subjects. Of these, one was deleted to equalize cell n's at nine per cell for the productivity change analyses of variance.

Procedure of the Experiment

The pretest data for this study were obtained via a Semantic Differential administered by local management as an "EDP Key Punch Section Evaluation," during the last week of January, 1966. The attitude pretest was a mimeographed booklet containing a cover sheet, a set of instructions governing the desired checking performance, ten pages of concepts and semantic differential scales, and a personal data page asking for the subject's name, seniority date, and major type of work performed (key-punching or verifying). This page also contained two (0-6) seven-point rating scales assessing: the subject's personal evaluation of her job performance, and the subject's assessment of how she felt

her supervisor would evaluate her job performance. The pre-test instrument may be examined in Appendix A.

Each of the concept judgment pages contained the concept to be judged at the top of the page followed by a variable number (5-10) of seven-point judging scales. A variable number of judging scales was used in instances where certain scales had little connection, in terms of face validity, with the concept to be judged. The adverbial qualifiers for each scale position were typed directly below the appropriate scale position. The sequential order of the scales was randomly varied from page to page, and the scales moved in different directions down the page, from generally negative on the left, to generally negative on the right, to preclude response constancy.

The experimental concepts, "Your Job" and "Introducing a New Method of Evaluating Your Job Performance" appeared second and fifth in the series of ten. The eight masking concepts, in order of presentation, were:

"Key Punch Operating as an Occupation."

"The Other Key Punch Operators in Oldsmobile's Key Punch Section Doing the Same Work You are Doing."

"The Method in Which Your Work is Evaluated."

"Your Supervisor."

"Oldsmobile Supervision Outside Your Department."

"Oldsmobile Data Processing Key Punch Section."

"Oldsmobile Data Processing Department."

"Oldsmobile Division, General Motors Corporation."

The procedure of the experimental manipulations was as follows:

(Phase II): The experimentor (also an Oldsmobile employee), functioning for the General Supervisor of Operations, was seated with the shift supervisor at the shift supervisor's desk in an office at the front of the work area. After a brief procedural discussion with the supervisor, the supervisor entered the work area and instructed one subject to report to his desk where she would be interviewed.

When the employee arrived, she was requested by the experimentor to be seated, given a letter signed by the General Supervisor to read, and then told that . . . "Mr. _____ (the General Supervisor) has asked me to introduce a letter from him. He could not be here today as planned, so he delegated this job to me. You are to read the letter and I'll answer any questions you have." The letters were identical as far as introducing the methods was concerned:

> In order to better evaluate the Data Processing Key Punch Activity, a new method of employee rating will be introduced during the month of April.
>
> For each employee, there are two ratings available: an 'Efficiency Score', ranging from -4 to +4 (with -4 being very poor, 0 average, and +4 very good), and an 'Effective Productivity Score', expressed in percentages ranging from 0 to 100 (with 0 being very poor, 50 average, and 100 very good).

Choice was manipulated by having subjects check which of the two scoring methods they preferred to be rated with:

> In the following space, please check which of the two scores <u>you</u> would prefer to be rated with:

A. Efficiency Score _____.
B. Effective Productivity Score _____.

The public or private commitment treatments modifying choice were assigned as follows:

> In the interests of time, you will be told of your initial score in a small group of from three to six other employees, early next week.

or:

> You will be told of your initial score, in private, early next week.

The Denied Choice conditions were operationalized by assigning subjects to one of the rating methods, modified by either a public or private score presentation as follows:

> You will be rated with the _____ score, and in the interests of time, will be told of your initial score in a small group of from three to six other employees, early next week.

or:

> You will be rated with the _____ score, and will be told of your initial score, in private, early next week.

When the subject finished with the message, and all questions were answered, she was instructed to return to her machine and have another subject report to the supervisor's office. This continued until all experimental subjects had been interviewed. The experimental messages may be examined in Appendix B1-6.

(Phase III): The following week, subjects were again contacted with the shift supervisor's aid, either singly or in small groups of from three to five people, and were informed of their initial productivity scores under the

applicable new rating method. After hearing their scores and having their questions answered, subjects were presented with the attitude posttest instrument; a three-page booklet, the first two pages of which were the two experimental concepts, each followed by four seven-point bipolar adjective scales. The third page of the booklet asked for name, seniority date, shift, and job classification, and bore two seven-point scales identical to the pretest scales where each subject rated her job performance both as she perceived it and as she felt her supervisor would perceive it. In addition, a seven-point scale for assessing the amount of perceived choice in the introduction of the scoring methods was included. This instrument may be examined in Appendix C.

When the scale checking was completed, all subjects were told that new productivity scores would be generated for the two week period beginning the following Monday, to be presented at the beginning of the third week.

Phase IV scores for the two week productivity period were computed for all experimental subjects, and were presented in the same manner as the initial scores had been. The subjects were informed at this time that in the future, productivity scores would be presented on a monthly basis, starting immediately.

While an additional productivity score (Phase V) was computed for each subject for the monthly period, no further experimental manipulations were performed.

Statistical Analyses

Pretest.--The four treatment groups used in this study were formed by dividing two Oldsmobile Division, G.M.C., Data Processing Department key-punch section shifts into four sub-groups on the basis of job classification. There were three such classifications: verifiers, key-punchers, and "beginners;" key-punch operators with less than one year's experience. In the initial distributions, there were five verifiers in each treatment group, six key-punchers in the Denied Choice-Private group, five in both the Denied Choice-Public and Choice-Private group, and three in the Choice-Public group. Each cell also contained two "beginners," with the exception of the Choice-Private group, which contained only one. These data are presented below in tabular form:

Distribution of Experimental Subjects by Job Classification into Treatment Groups

Job Classification	Treatment Group				
	C Pr	C Pb	DC Pr	DC Pb	
Verifiers	5	5	5	5	
Key-punchers	5	3	6	5	
Beginners	1	2	2	2	
Total	11	10	13	12	= 46

Once subjects had been randomly assigned to cells on the basis of job classification, and the cells in turn randomly assigned to treatment conditions, pretest attitudes toward the two experimental concepts were used as a randomization

check on the additional variable, while pretest productivity scores were used as the basis for the randomization check on that variable.

The pretest scores were computed in the following manner:

Pretest attitudes were indexed by the sum of scores on four (0-6) seven-point bipolar adjective scales used to judge each experimental concept. These raw scores were used for the randomization analysis of variance.

Pretest productivity scores were computed as follows: Verifier and key-puncher productivity figures (consisting of total productive hours and cumulative "strokes" for each subject) for the months November and December, 1965, and January, 1966, were used to compute a departmental mean and standard deviation expressed in "strokes per hour" for both verifiers and key-punchers. Each verifier's and key-puncher's productivity mean over the three month period was then referred to the appropriate departmental distribution and a standard pretest score, or *z* score, was computed for each subject.

The "Beginners" category presented somewhat of a problem. As these subjects were learners, the obvious assumption was that learning would occur from time of hire until some future date and then level off, so that from month-to-month, only minor fluctuations would occur in some hypothetical learning curve. An examination of the distribution of scores by month showed that learning progressed at a steady

rate for six months, then alternately dipped and climbed slightly during the next six months, so that the twelfth-month point on a 12-month learning curve for these subjects approximated the mean productivity figure for experienced key punchers; who ranged, hypothetically, from those with a minimum of 13 month's experience to those with as many as 20 to 30 year's experience.

For the purpose of evaluating the "beginners" productivity development, the experimentor consolidated five years of extant monthly productivity figures and developed a twelve column distribution, from date of hire through each of the first twelve months on the job for each employee newly hired within that five year period.

These data became the input to a computer program written to compute means and standard deviations for each of the 12 months comprising all employees' first year on the job. Those experimental subjects falling into the "beginners" category were then referred to the column of the distribution corresponding to their current month of service, and their productivity mean for that month used as a deviation from that month's mean in computing the subject's standardized pretest productivity score.

Thus, there were 14 productivity distributions: one each for verifiers and key-punchers, and 12 for "beginners," with each of the latter 12 distributions corresponding to the first through the twelfth month as a key-puncher. The

pretest productivity distributions may be examined in Appendix D.

Once an employee's pretest productivity figure had been calculated and referred to the appropriate job classification distribution, a standardized score or *z* score for the employee was calculated and used as a derived raw score in the pretest productivity randomization analysis of variance.

Posttest.--Attitude change (Phase III minus Phase I) and Productivity gain (Phase IV minus Phase I and Phase V minus Phase I) formed the two dependent variables in this study.

Attitude Change.--Following the Phase III attitude assessment, attitude change scores for each employee were tabulated as follows: Each employee's Phase III attitude score was subtracted from her Phase I attitude score for each concept, and the signed difference scores used for the attitude change analyses of variance.

Productivity Change.--Productivity change was measured twice in this experiment; for a Phase IV period of two weeks, and a Phase V period of a calendar month. At the end of each experimental period, each individual's productivity mean was referred to the appropriate job classification distribution and a standardized score for that subject computed. These scores were then subtracted from the employee's Phase I *z* score, and the signed difference *z* score used in the analysis of variance.

In addition, there was an overall or grand mean productivity assessment utilizing t tests for independent measures based on both the Phase IV and V grand means in relation to the Phase I or pretest productivity grand mean.

In summary, the study consisted of the following five phases:

Phase I: Assessment of attitudes toward two experimental concepts; plus, independently, computation of individual and departmental productivity norms.

Phase II: Exposure to interviews and departmental letters under the following four choice and commitment conditions, eight weeks later:

(1) Choice-Private: Presentation of a message offering a choice between two objective employee productivity rating methods, with the individual's subsequent performance scores to be presented in private.

(2) Choice-Public: Same as (1) above, with the exception that the individual's subsequent performance scores were to be presented in public.

(3) Denied Choice-Private: Presentation of a message mentioning both rating methods, but assigning one of them, with subsequent performance scores to be presented in private.

(4) Denied Choice-Public: Same as (3) above, with the exception that the individual's subsequent performance scores were to be presented publicly.

Phase III: Presentation of Phase I (pretest) productivity scores one week after the Phase II manipulations, according to the public-private design, and followed by a posttest attitude and perceived choice assessment. In addition, subjects were

told that the next presentation of scores would occur in three weeks, based on productivity for the two week period immediately following.

Phase IV: Three weeks after Phase III, with presentation of scores earned during the previous two weeks, public or private as in Phase III. Subjects were told at this time that subsequent scores would be based on monthly productivity.

Phase V: One month after Phase IV: computation of individual productivity scores for the previous calendar month.

Statistical analyses performed were:

(1) Phase I: Factorial analyses of variance of pretest attitude and productivity measures (randomization check).

(2) Phase III: (a) Factorial analysis of variance of perceived choice scores.

(b) Attitude change factorial analyses of variance (Phase III minus Phase I).

(3) Phase IV: Productivity change factorial analysis of variance (Phase IV scores minus Phase I scores).

(4) Phase V: Productivity change factorial analysis of variance (Phase V scores minus Phase I scores).

(5) Posttest: Overall productivity change: t tests based on Phase I grand mean in relation to Phase IV and Phase V grand means.

The results of these statistical analyses are presented in the following chapter.

CHAPTER III

RESULTS

The statistical analysis of the data to be presented is divided into three parts: (I) a check on the extent to which subjects randomly distributed into treatments on the basis of pretest (a) attitudes toward the two experimental concepts and (b) productivity measures; (II) the relationship between a priori choice groupings and the amount of choice actually perceived by subjects within each treatment group; and (III) tests of hypotheses predicting relationships between (a) perceived choice and attitude change and (b) commitment and productivity gain.

I. Randomness

(a) Attitudinal measures

The mean pretest attitudes on a zero to 24 scale (the sum of four 0-6 scales) toward the two experimental concepts for the four treatment groups are presented in Table 1. Analyses of variance of these scores did not yield significant F ratios (Table 2); on this basis, there appears to be no reason for assuming that the treatment groups differed on pretest attitudes toward the two concepts.

Table 1

Comparison of Pretest Attitude Scores by Treatment Group (Phase I)***

Measure		Treatment Group C Pb	C Pr	DC Pb	DC Pr
Pretest attitude toward job	Mean	22.000	21.100	21.500	20.900
	S.D.	1.943	3.107	1.509	1.852
Pretest attitude toward rating method	Mean	17.500	16.600	17.900	17.500
	S.D.	4.062	4.299	3.541	4.006

***Due to a post-experimental subject deletion procedure used to equalize cell n's at ten subjects per cell, identical mean attitude scores toward the rating method concept were obtained for the Choice-Public and Denied Choice-Private groups for both the pretest and posttest periods.

Table 2

Summary of Analyses of Variance on Pretest Attitude Scores (Phase I)

Source of Variation	df	SS	MS	F	Probability of F Statistic
		Job Concept			
Rows (Choice)	1	4.225	1.225	.225	.62
Columns (Commitment)	1	5.625	5.625	1.175	.29
Interaction	1	.225	.225	.047	.81
Error	36	172.300	4.786		
Total	39	179.375			
		Rating Method Concept			
Rows (Choice)	1	4.225	4.225	.265	.62
Columns (Commitment)	1	4.225	4.225	.265	.62
Interaction	1	.625	.625	.039	.82
Error	36	572.300	15.897		
Total	39	581.375			

(b) Productivity measures

The mean pretest productivity scores for each of the four treatment groups are presented in Table 3. Pretest productivity scores were computed in *z* score form. Analysis of variance of these scores did not yield significant F ratios (Table 4). On this basis, there is no apparent reason to assume that the treatment groups differed on the Productivity variable.

Table 3

Comparison of Pretest Productivity Scores by Treatment Group (Phase I)

		Treatment Group			
Measure		C Pb	C Pr	DC Pb	DC Pr
Pretest Productivity	Mean	.511	-.051	-.208	-.074
	S.D.	1.288	.805	.995	1.074

Table 4

Summary of Analysis of Variance on Pretest Productivity Scores (Phase I)

Source of Variation	df	SS	MS	F	Probability of F Statistic
		Pretest Productivity			
Rows (Choice)	1	1.239	1.239	1.113	.30
Columns (Commitment)	1	.413	.413	.371	.55
Interaction	1	1.088	1.088	.978	.33
Error	32	35.606	1.112		
Total	35	38.348			

II. Perceived Choice

The mean perceived choice (on a 0-6, seven-point scale) for each treatment group is shown in Table 5. It had been hypothesized that:

> H_1: Individuals making a decision between two productivity rating methods with subsequent private score presentations will perceive greater freedom of choice than either those making a decision with subsequent public score presentations, or those who are assigned a rating method; regardless of the type of score presentation (C Pr > C Pb, DC Pr, DC Pb).

Table 5

Comparison of Perceived Choice Scores by Treatment Group (Phase III)

		Treatment Group			
Measure		C Pb	C Pr	DC Pb	DC Pr
Perceived Choice	Mean	2.100	4.400	2.300	2.400
	S.D.	1.792	1.075	2.584	1.647

As predicted, the Choice-Private group perceived greater freedom of choice than did any of the other three treatment groups. Analysis of variance of the perceived choice scores (Table 6) showed that the main effect of privateness of commitment was significant at the .05 level of confidence, while the interaction between choice and commitment was nearly so at the .08 level. With greater experimental precision, one might also expect the interaction

between choice and commitment to have reached significance. The confirmation of the perceived choice hypothesis would indicate the success of the experimental manipulations in creating the differential perception of choice posited as a necessary condition for the arousal of cognitive dissonance in the attitude change portion of this study.

Table 6

Summary of Analysis of Variance on Amount of Perceived Choice (Hypothesis I)

Source of Variation	df	SS	MS	F	Probability of F Statistic
		Perceived Choice			
Rows (Choice)	1	8.100	8.100	2.355	.13
Columns (Commitment)	1	14.400	14.400	4.187	.05
Interaction	1	12.100	12.100	3.518	.08
Error	36	123.800	3.438		
Total	39	158.400			

III. (a) Induced Choice and Attitude Change

The attitude change hypothesis tested in this study was merely a restatement of perceived choice hypothesis (H_1):

H_2: Individuals making a decision between two productivity rating methods with subsequent private score presentations will change more favorably in attitude toward both the rating methods and their job than will those making a decision with subsequent public score presentations, or those who are assigned a rating method; regardless of the type of score presentation (C Pr > C Pb, DC Pr, DC Pb).

In short, one would expect the perceived choice differences presented in Table 5 to be reflected in differential mean attitude change scores in Table 7. An examination of the mean attitude change data in Table 7 shows that while the Choice-Private group experienced the greatest positive attitude change toward the rating method concept, and the least negative change toward the job concept, neither of these differences were statistically significant (Table 8).

Table 7

Comparison of Attitude Change Scores Toward Two Concepts by Treatment Group (Phase III)

Measure		Treatment Group			
		C Pb	C Pr	DC Pb	DC Pr
Mean attitude change toward job concept	Mean	-.700	-.500	-1.100	-2.400
	S.D.	1.567	3.240	1.792	2.675
Mean attitude change toward rating method concept	Mean	-1.800	1.000	-2.700	-1.800
	S.D.	6.729	6.815	6.864	5.308

Table 8

Summary of Analyses of Variance on Attitude Change Scores (Hypothesis II)

Source of Variation	df	SS	MS	F	Probability of F Statistic
		Job Concept			
Rows (Choice)	1	13.225	13.225	2.268	.14
Columns (Commitment)	1	3.025	3.025	.518	.48
Interaction	1	5.625	5.625	.964	.33
Error	36	209.775	5.830		
Total	39	231.775			

Table 8. Continued

Source of Variation	df	SS	MS	F	Probability of F Statistic
		Rating Method Concept			
Rows (Choice)	1	34.225	34.225	.819	.37
Columns (Commitment)	1	34.225	34.225	.819	.37
Interaction	1	9.025	9.025	.219	.65
Error	36	1503.300	41.758		
Total	39	1580.775			

III (b). Commitment and Productivity Gain

The productivity change hypothesis tested for both the Phase IV and Phase V productivity periods predicted that:

H_3: Individuals who learn their performance scores under public conditions will increase productivity more than those who learn their performance scores under private conditions (C Pb and DC Pb > D Pr, DC Pr).

It had been suggested that public commitment condition subjects would be motivated to increase productivity in order to reduce the dissonance engendered in the public score presentations. Such motivational pressures should be minimal in the private commitment conditions, so that productivity increases over and above random error expectations would not be expected to occur within these conditions.

Phase IV Results.--As predicted (Table 9), the public commitment condition subjects increased productivity to a greater extent during the two week Phase IV period than did the private commitment condition subjects. Analysis of the productivity change scores (Table 10) yielded a

significant F ratio of 4.633 for the main effect of publicness of commitment. This statistic was significant at the .04 level of confidence, thus supporting the public commitment hypothesis for the Phase IV productivity period.

Table 9

Comparison of Posttest Productivity Change Scores by Treatment Group (Phase IV)

		Treatment Group			
Measure		C Pb	C Pr	DC Pb	DC Pr
Productivity Change Scores (Phase IV)	Mean	.432	.007	1.013	.208
	S.D.	.750	.482	1.276	.711

Table 10

Summary of Analysis of Variance on Posttest Productivity Change Scores (Hypothesis III)

Source of Variation	df	SS	MS	F	Probability of F Statistic
		Phase IV Productivity Change			
Rows (Choice)	1	1.376	1.376	1.887	.18
Columns (Commitment)	1	3.397	3.397	4.633	.04
Interaction	1	.324	.324	.433	.52
Error	32	23.467	.733		
Total	35	28.567			

Phase V Results.--The data presented in Tables 11 and 12, based on productivity change for the Phase V productivity

period, fail to support the commitment hypothesis. As a comparison of the mean productivity change scores by experimental period shows (Tables 9 and 11), the public commitment condition subjects maintained the same relative level of productivity during Phase V as for Phase IV, but private commitment condition subjects increased productivity during the Phase V period. This mean increase in the private conditions negated the significant main effect of publicness of commitment for the Phase V period. A tenable explanation for this mean increase is offered in the following chapter.

Table 11

Comparison of Posttest Productivity Change Scores by Treatment Group (Phase V)

		Treatment Group			
Measure		C Pb	C Pr	DC Pb	DC Pr
Productivity Change Scores (Phase V)	Mean	.417	.442	1.121	.418
	S.D.	.826	.745	1.353	.550

Table 12

Summary of Analysis of Variance on Posttest Productivity Change Scores (Hypothesis III)

Source of Variation	df	SS	MS	F	Probability of F Statistic
	Phase V Productivity Change				
Rows (Choice)	1	1.040	1.040	1.234	.27
Columns (Commitment)	1	1.003	1.003	1.226	.28
Interaction	1	1.188	1.188	1.409	.24
Error	32	26.969	.848		
Total	35	30.231			

Overall Productivity Change.--While the predicted Phase V productivity change was not statistically significant, a comparison of the overall, or grand mean productivity scores (Table 13) shows that overall mean productivity for the Phase V period was statistically significant at the .01 level (by *t* test) when compared with the overall or grand pretest productivity mean.

Table 13

Comparison of Departmental Grand Mean Productivity by Experimental Period

Experimental Period	N	Mean	SD	Obtained *t*	Pr. of *t*
Phase I	36	.044	1.047	---	---
Phase IV	36	.460	1.164	1.564	.06
Phase V	36	.644	1.011	2.419	.01

CHAPTER IV

DISCUSSION AND CONCLUSIONS

This study was designed to determine the effects of (1) freedom of choice in a decision between two productivity rating methods on attitude change toward both the rating methods and the individual's job and (2), publicness of subsequent score presentations (commitment) on productivity gain. Four choice and commitment conditions were established in which choice or commitment was varied. The specific hypotheses tested will be discussed in turn in the following pages.

Perceived Choice

The perceived choice hypothesis tested was as follows:

H_1: Individuals making a decision between two productivity rating methods with subsequent private score presentations will perceive greater freedom of choice than either those making a decision with subsequent public score presentations, or those who are assigned a rating method; regardless of the type of subsequent score presentation (C Pr > C Pb, DC Pr, DC Pb).

The data presented in Chapter III indicate support for this hypothesis. The Choice-Private group's perceived choice mean was 4.40, or about two scale points (on a 0-6 scale) greater than any of the other three groups, with the main

effect of privateness of commitment statistically significant at the .05 level of confidence. There were no real differences between the other three groups; all fell at the lower end of the same scale, with the group means ranging from 2.10 to 2.40.

The confirmation of the perceived choice hypothesis would indicate the success of the experimental manipulations in creating the differential perception of choice posited as a necessary condition for the existence of cognitive dissonance in the attitude change portion of this study.

Induced Choice and Attitude Change

The attitude change hypothesis tested in this study was merely a restatement of the above perceived choice hypothesis:

> H_2: Individuals making a decision between two productivity rating methods with subsequent private score presentations will change more favorably in attitude toward both the rating methods and their jobs than will those making a decision with subsequent public score presentations, or those who are assigned a rating method; regardless of the type of score presentation (C Pr > C Pb, DC Pr, DC Pb).

This hypothesis was based directly on the dissonance theory generalization that attitude change varies directly with the subjective perception of choice. It had been expected that subjects in the Choice-Private condition, perceiving the greatest freedom of choice, would also experience the greatest dissonance, and would change attitudes in order to reduce it. While the Choice-Private group did indeed perceive the greatest freedom of choice,

the predicted attitude change did not occur. While there are undoubtedly many theoretically based explanations for the failure of the differential perception of choice to be reflected in attitudinal differences, the following commentary will be based primarily on an event that took place during the Phase III portion of this study. It is this experimentor's position that other explanations are of secondary or even tertiary importance in comparison.

The event of interest is termed a "group retaliation" effect, and had its genesis in the following manner. During the course of the Phase III manipulations (presentation of initial productivity scores, followed by the attitude posttest), a member of the Denied Choice-Private group (Employee A) was told that her initial score under the applicable method was -.160 (*z* score). She became visibly upset and rather hostile, but completed the attitude scale checking, and then returned to her work area and went on a break with a number of other employees. The Phase III score presentations and attitude posttests continued for some ten minutes, and were then halted due to the lack of available subjects. A few minutes later, a number of employees returned from their break and the Phase III manipulations continued.

During these later treatments, no fewer than five subjects made direct reference to the experimentor that Employee A had been very threatened, and had made some very disparaging remarks about the study and the organization. As these five subjects were among the last to be tested, and

their posttest instruments were readily available, the experimentor was able to verify their attitudinal responses. Four of the five subjects (Employee A's group leader, one of the five, showed only minor change) checked the four scales under the "Rating Method" concept consistently negative as follows:

Employee B: Checked each scale as zero. Net change in attitude toward the concept: -20.

Employee C: Checked all but one scale as zero. The other was checked as 1. Net change in attitude: -19.

Employee D: Checked all scales as neutral, or 3. Net change in attitude: -12.

Employee E: Checked all scales at neutral, or 3. Net change in attitude: -8.

While these employees may have been retaliating against the experimentor for upsetting an informal work group member, it is also possible that they were protecting Employee A. That is, by their all checking the scales in the same manner (consistently negative, as also had Employee A), it would be impossible to single out any one employee for criticism. It is also quite possible that subjects other than these four were decrementally influenced by Employee A. While no other subjects gave such an indication or checked the scales in such a fashion, it would seem reasonable that potential attitude change was severely curtailed by Employee A's behavior.

The "group retaliation" effect does, however, serve a worthwhile purpose. Commitment to some type of negative,

unpleasant, or discrepant behavior is posited as one of the necessary conditions for the arousal of cognitive dissonance in the literature. It is suggested that Employee A's reaction to the performance information illustrates the negative aspects of the score presentations. It should be remembered that Employee A's initial score was not objectively "bad" (-.160, *z* score), but rather "average," and that this score was presented in private rather than in the presence of others.

Even though the "group retaliation" effect seriously distorted the attitude change data, the Choice-Private group, for whom the greatest attitude change had been predicted, did in fact change the most. As concerns the rating method concept, this group had a mean change of 1.000. All other groups changed negatively in mean score as follows: the Choice-Public and Denied Choice-Private groups each changed by -1.800, and the Denied Choice-Public group changed by -2.700.

Of course, as mentioned in the footnote to Table 1 in Chapter III, due to the post-experimental subject deletion procedure used to equalize cell n's at ten, identical results were obtained for the Choice-Public and Denied Choice-Private groups for both the pre- and posttest periods. While no pun is intended, as change would have it, none of the four subjects mentioned as participants in the "group retaliation" effect were deleted from the study.

All attitude change toward the job concept was in a negative direction. This concept had been considered to be of secondary importance, and was included in the study only to see if the predicted attitude change toward the rating method concept would generalize and also affect the evaluation of one's job. This mean negative change by treatment group was as follows: Choice-Private: -.500, Choice-Public: -.700, Denied Choice-Public: -1.100, and Denied Choice-Private: -2.400. These changes were not statistically significant.

At the time this study was proposed, an additional attitudinal assessment was included in the experimental design. This assessment was to have taken place after an additional score presentation, which too, was deleted. These portions of the study were deleted due to a conflict in time. Given the statistically significant productivity increases to be discussed in the following section, one might speculate whether the effects of a public commitment might also have resulted in greater "liking" for the rating methods. At any rate, to minimize the chances of random error, these additional assessments had been included in the original design.

In summary, neither the theory nor the research on which this portion of the study was based have been questioned. The obtained attitudinal results, confounded as they were by the "group retaliation" effect, and additionally muddled due to the extremely rare results of the subject deletion

procedure, are nearly impossible to assess via any theoretic considerations. As the predicted attitude change was in the right direction for the group for whom intended, one must conclude that faulty experimental control, manifesting itself in unintended interaction between experimental subjects, rendered meaningless the attitude change data of this study.

Publicness of Score Presentations (Commitment) and Productivity Gain

The hypothesis tested in both phases of the productivity gain portion of this study was:

> H_3: Individuals who learn their performance scores under public conditions will increase productivity more than those who learn their performance scores under private conditions (C Pb and DC Pb > D Pr and DC Pr).

The rationale underlying this hypothesis was as follows: the performance information to be presented to the experimental subjects was objectively the same for all groups. That is, having randomized subjects to groups, one's "best bet" is that the individual groups are the same, within random error expectations. Subjectively, however, the information presented should be differentially perceived depending on whether subsequent score presentations are public or private. Individuals in the public commitment conditions, where one's possible poor performance would be learned in the presence of others, should be motivated to increase productivity and thus avoid such discrepant information in the future. This would follow from the dissonance theory prediction that the arousal of dissonance increases

as the potential unpleasantness of the situation increases. In other words, others' knowledge of one's poor performance should enter as a cognition against that level of performance, and one should be motivated to increase productivity and thus reduce or eliminate the dissonance engendered in the public score presentations. In addition, within the public score presentation conditions, but not the private conditions, knowledge of others' performance should provide a standard of productivity comparison for the individual.

Within all four conditions, one would expect productivity scores that were extracted from extant records when productivity was not a particularly salient issue, to be perceived as generally low when productivity was a salient issue. Of course, the nature of the score presentation should also modify this perception.

In short, due to the nature of the commitment made, motivational pressures directed toward increasing productivity should be greater in the public than in the private conditions. The pages following will be directed to a discussion of this rationale as applied to the results obtained by experimental period.

Phase IV Period.--As predicted, mean productivity gain within the public conditions for the two week Phase IV period was significantly greater than that within the private conditions, with the main effect of publicness of commitment significant at the .04 level of confidence. It would appear that the theoretic rationale is supported by

these results. That is, public commitment subjects, apparently motivated by the dissonance engendered in the public score presentations, increased productivity so as to avoid such dissonant information in the future, while private condition subjects, experiencing dissonance of a much lesser degree, did not increase productivity above random error expectations.

Phase V Period.--During this second period of productivity observation, a mean increase within the private commitment conditions vitiated the between treatment differences present at the end of the Phase IV period. During this productivity period, the public conditions maintained their Phase IV level of productivity, while the private conditions increased productivity above their Phase IV level, but to a lesser degree than that attained by the public conditions. This increase was large enough, however, so that the Phase V differences were not statistically significant. Of course, if the private conditions has maintained the same relative level of productivity for the Phase V period as for the Phase IV period, the differences would have remained statistically significant.

There are a number of alternative ways of viewing the Phase V results. One would be to forward the idea of an "Hawthorne" effect as instrumental in destroying the between group differences present at the end of the Phase IV period. However, if one considers the results for the Phase V period

as being due to such an effect, then one would have to overlook the presumed dissonance effects for the Phase IV period.

Fortunately, there is a common sense explanation that will account for the Phase V mean increases in the private conditions (my thanks to Dr. Eugene Jacobson for his assistance in developing this hypothesis). Unlike most psychological experiments where subjects are college students in contact with each other for only a short period of time, if at all, the experimental subjects in this study were industrial employees interacting freely in the normal functioning of their department over the term of this experiment. Over time, subjects undoubtedly communicated information about the study, including performance information, which would, of course, tend to diffuse along lines other than those artificial channels created by the experimental design. While it had been hypothesized that individuals learning their scores in private would be minimally motivated to increase productivity due to the fact that there was little external pressure on them to do so, and public condition subjects would be maximally motivated to increase productivity (due both to others' learning of one's performance, and one's learning of others' performance), communication along lines other than those specified in the experimental design would have tended to increase the motivational pressures within the private conditions. Over the term of the experiment, the private condition subjects probably found that their performance scores were not totally private, due both to the

information they themselves and transmitted, and the information furnished by the "grape-vice"; as distorted as it might have been.

While certainly not conclusive, an informal check with several subjects in the private conditions revealed that this was the case. These subjects knew something of the performance scores of both other private condition subjects and public condition subjects. This information was transmitted over friendship lines, which, of course, were not the same as the information channels created by this experiment. Given the existence of such comparative information, one might expect productivity to increase.

If one accepts this explanation for the productivity increases within the private conditions as plausible, the next question one would ask is why subjects within the public conditions did not further increase productivity during the Phase V period. While it could be that these subjects were satisfied with their Phase IV level of productivity, in that it reduced dissonance sufficiently so that additional increases were not necessary (for psychological well-being at least), a re-examination of the obtained results by experimental period suggests at least two additional reasons for the non-significant Phase V differences:

	Treatment Group			
Experimental Period	C Pb	DC Pb	C Pr	DC Pr
Phase I (pretest) mean	.511	-.208	-.051	-.074
Phase IV gain	.432	1.013	.007	.208
Phase IV mean	.943	.805	-.044	.134
Phase V gain	-.015	.108	.435	.210
Phase V mean	.928	.913	.391	.344

First, the factorial analyses of variance were based on productivity change scores, from pretest (Phase I) to both posttest periods (Phases IV and V). While the randomization analysis of variance of pretest productivity scores did not yield a significant F ratio, the Choice-Public group was much higher in mean pretest productivity than the other experimental groups, and thus had less "room" to increase productivity. This factor would account for the apparent differences between the Choice-Public and Denied Choice-Public groups in productivity gain over the course of the experiment.

Second, if one looks at actual mean productivity for each experimental group at the end of Phases IV and V, it would appear that a productivity ceiling had been attained within the public conditions. Clearly, at the end of both periods of productivity observation, the public groups cluster together in terms of mean productivity, as do the private groups. The fact that the public groups are nearly identical in mean productivity at the conclusion of the study would lend credence to this view.

While the Phase V analysis of variance did not yield a significant F ratio, overall or grand mean productivity for this period was statistically significant when compared with the pretest productivity grand mean: $t = 2.419$, $df = 70$, probability of $t = .01$.

In brief summary, the failure to achieve, or rather maintain statistical significance during the Phase V

productivity period appears to be due to (1) inadequate experimental control, manifesting itself in unintended interaction between experimental subjects, and (2) the existence of a rather high pretest measure on the productivity variable by one of the experimental groups.

Summary of Experimental Findings

Perceived Choice Hypothesis (H_1).--This hypothesis was supported. As predicted, the Choice-Private group perceived greater freedom of choice in the experimental situation than did any of the other experimental groups. This differential perception of choice was taken as an indication of the existence of cognitive dissonance; an hypothesized necessary condition for subsequent attitude change.

Attitude Change Hypothesis (H_2).--This hypothesis was not supported. While the attitude change was in the right direction for the group for whom predicted, these differences were not statistically significant. The failure of the the perceived choice differences to be reflected in differential attitude change was considered a joint function of a "group retaliation" effect, wherein a number of employees, influenced by an employee who was extremely threatened by the performance information, checked the posttest rating scales in a consistently negative fashion, and a posttest subject deletion that resulted in identical mean scores for both the pre- and posttest periods for two experimental groups.

Productivity Gain Hypothesis (H_3).--This hypothesis was supported for the Phase IV period, but not for the Phase V period.

Phase IV. During this productivity period, dissonance was presumed present in the public conditions due to the nature of the public commitment made by these subjects, and was deemed of sufficient magnitude so that productivity was increased so as to reduce it. Dissonance of a lesser degree was presumed present in the private conditions, so that only random fluctuations in productivity occurred.

Phase V. During this second period of productivity observation, public condition subjects maintained their Phase IV level of productivity, while private condition subjects increased productivity above their Phase IV level, but to a lesser extent that that attained by the public condition subjects. This mean increase within the private conditions was great enough, however, so that the Phase V differences were not statistically significant.

It was suggested that communication behavior beyond the scope of the experimental design increased motivational pressures within the private conditions, leading to concomitant productivity increases that vitiated the differences present at the conclusion of Phase IV. In addition, it was suggested that a productivity ceiling had been reached by the public groups, so that further gains were very unlikely. A key factor in the failure to maintain significance for

this period was that one of the public groups was much higher than any of the other three groups in mean pretest productivity, and thus had less "room" to change.

REFERENCES

REFERENCES

Aronson, E. and J. Mills, "The effect of severity of initiation on liking for a group," J. Ab. Soc. Psych., 1959, 59, 177-181.

Brehm, J., "Post decision changes in the desirability of alternatives," J. Ab. Soc. Psych., 1956, 52, 384-389.

_____, "Increasing cognitive dissonance by a fait accompli," J. Ab. Soc. Psych., 1959, 58, 379-382.

_____, "Attitudinal consequences of commitment to discrepant behavior," J. Ab. Soc. Psych., 1960, 60, 379-383.

_____, and A. Cohen, "Re-evaluation of choice alternatives as a function of their number and qualitative similarity," J. Ab. Soc. Psych., 1959, 58, 373-378.

_____, and A. Cohen. Explorations in Cognitive Dissonance. New York: John Wiley and Sons, 1962.

Chapanis, N. and A. Chapanis, "Cognitive dissonance: five years later," Psych. Bull., 1964, 61, 1-22.

Cohen, A., "Attitudinal consequences of induced discrepancies between cognitions and behavior," Public Opinion Quarterly, 1960, 24, 297-318.

_____, J. Brehm, and B. Latane, "Choice of strategy and voluntary exposure to information under public and private conditions," J. Pers., 1959, 27, 63-73.

_____, J. Brehm, and W. Fleming, "Attitude change and justification for compliance," J. Ab. Soc. Psych., 1958, 56, 276-278.

_____, H. Terry, and C. Jones, "Attitudinal effects of choice in exposure to counterpropaganda," J. Ab. Soc. Psych., 1959, 58, 388-391.

Davis, K. and E. Jones, "Changes in interpersonal perception as a means of reducing cognitive dissonance," J. Ab. Soc. Psych., 1960, 61, 402-410.

Deutsch, M. and R. Krauss, Theories in Social Psychology. New York: Basic Books, Inc., 1965.

Deutsch, M., R. Krauss, and N. Rosenau, "Dissonance or defensiveness?" J. Pers., 1962, 30, 16-28.

Festinger, L., A Theory of Cognitive Dissonance. Stanford: Stanford U. Press, 1957.

_____, and J. Carlsmith, "Cognitive consequence of forced compliance," J. Ab. Soc. Psych., 1959, 58, 203-210.

Janis, I. and J. Gilmore, "The influence of incentive conditions on the success of role playing in modifying attitudes," J. Pers. Soc. Psych., 1965, 1, 17-27.

McGuire, W., "Attitudes and opinions," Annu. Rev. Psychol., 1966, 17, 475-514.

Rabbie, J., J. Brehm, and A. Cohen, "Verbalization and reactions to cognitive dissonance," J. Pers., 1959, 27, 407-417.

Zajonc, R., "Balance, congruity, and dissonance," Public Opinion Quarterly, 1960, 24, 280-296.

Zimbardo, P., "Involvement and communication discrepancy as determinants of attitude change," J. Ab. Soc. Psych., 1960, 60, 86-94.

APPENDICES

APPENDIX A

PRETEST ATTITUDE INSTRUMENT

OLDSMOBILE DIVISION, GENERAL MOTORS CORPORATION

E.D.P. Key Punch Operator Evaluation

Please read the following pages in sequence and follow all instructions exactly. There is no correct answer to any question; we are interested only in how you feel about certain ideas. Please make sure you fill out the last page completely, as that data will be used for purposes of analysis. No one will ever know how you responded to the questions. Thank you.

On each page of this booklet you will find a different concept to be judged and beneath it a set of scales. You are to rate the concept on each of these scales in order.

Here is how you are to use the scales:

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

Good	X	:		:		:		:		:		:		Bad
	extremely		quite		slightly		neither		slightly		quite		extremely	

or

Good		:		:		:		:		:		:	X	Bad
	extremely		quite		slightly		neither		slightly		quite		extremely	

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

Fair		:	X	:		:		:		:		:		Unfair
	extremely		quite		slightly		neither		slightly		quite		extremely	

or

Fair		:		:		:		:		:	X	:		Unfair
	extremely		quite		slightly		neither		slightly		quite		extremely	

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

Cruel		:		:	X	:		:		:		:		Kind
	extremely		quite		slightly		neither		slightly		quite		extremely	

or

Cruel		:		:		:		:	X	:		:		Kind
	extremely		quite		slightly		neither		slightly		quite		extremely	

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

Safe		:		:		:	X	:		:		:		Dangerous
	extremely		quite		slightly		neither		slightly		quite		extremely	

IMPORTANT: (1) Place your chek mark in the middle of spaces, not on the boundaries:

THIS		NOT THIS	
_____:	___X___ :	_____:	_____X: _____

(2) Do not omit any scales.

(3) Never put more than one check mark on a single scale.

Work at a fairly high speed through this questionnaire. Do not worry or puzzle over individual items. It is your first impressions, the immediate "feelings" about the items that we want.

Key Punch Operating as an Occupation.

leasant	_____	_____	_____	_____	_____	_____	_____	Unpleasant
	extremely	quite	slightly	neither	slightly	quite	extremely	
nstable	_____	_____	_____	_____	_____	_____	_____	Stable
	extremely	quite	slightly	neither	slightly	quite	extremely	
Nice	_____	_____	_____	_____	_____	_____	_____	Awful
	extremely	quite	slightly	neither	slightly	quite	extremely	
orthless	_____	_____	_____	_____	_____	_____	_____	Valuable
	extremely	quite	slightly	neither	slightly	quite	extremely	
Good	_____	_____	_____	_____	_____	_____	_____	Bad
	extremely	quite	slightly	neither	slightly	quite	extremely	
nskilled	_____	_____	_____	_____	_____	_____	_____	Skilled
	extremely	quite	slightly	neither	slightly	quite	extremely	

Your Job At Oldsmobile Division,
General Motors Corporation

aluable	extremely	quite	slightly	neither	slightly	quite	extremely	Worthless
nskilled	extremely	quite	slightly	neither	slightly	quite	extremely	Skilled
leasant	extremely	quite	slightly	neither	slightly	quite	extremely	Unpleasant
Nice	extremely	quite	slightly	neither	slightly	quite	extremely	Awful
nstable	extremely	quite	slightly	neither	slightly	quite	extremely	Stable
Good	extremely	quite	slightly	neither	slightly	quite	extremely	Bad

The Other Key Punch Operators in Oldsmobile's

Key Punch Section Doing The Same Work You Are Doing.

leasant	_____	_____	_____	_____	_____	_____	_____	Unpleasant
	extremely	quite	slightly	neither	slightly	quite	extremely	
Cruel	_____	_____	_____	_____	_____	_____	_____	Kind
	extremely	quite	slightly	neither	slightly	quite	extremely	
Bad	_____	_____	_____	_____	_____	_____	_____	Good
	extremely	quite	slightly	neither	slightly	quite	extremely	
luable	_____	_____	_____	_____	_____	_____	_____	Worthless
	extremely	quite	slightly	neither	slightly	quite	extremely	
Awful	_____	_____	_____	_____	_____	_____	_____	Nice
	extremely	quite	slightly	neither	slightly	quite	extremely	
Skilled	_____	_____	_____	_____	_____	_____	_____	Unskilled
	extremely	quite	slightly	neither	slightly	quite	extremely	
Unfair	_____	_____	_____	_____	_____	_____	_____	Fair
	extremely	quite	slightly	neither	slightly	quite	extremely	

The Method in Which Your Work is Evaluated

Valuable	_____	_____	_____	_____	_____	_____	_____	Worthless
	extremely	quite	slightly	neither	slightly	quite	extremely	
Bad	_____	_____	_____	_____	_____	_____	_____	Good
	extremely	quite	slightly	neither	slightly	quite	extremely	
Awful	_____	_____	_____	_____	_____	_____	_____	Nice
	extremely	quite	slightly	neither	slightly	quite	extremely	
Safe	_____	_____	_____	_____	_____	_____	_____	Dangerous
	extremely	quite	slightly	neither	slightly	quite	extremely	
Unfair	_____	_____	_____	_____	_____	_____	_____	Fair
	extremely	quite	slightly	neither	slightly	quite	extremely	
Decisive	_____	_____	_____	_____	_____	_____	_____	Indecisive
	extremely	quite	slightly	neither	slightly	quite	extremely	
Skilled	_____	_____	_____	_____	_____	_____	_____	Unskilled
	extremely	quite	slightly	neither	slightly	quite	extremely	

| | | |

Introducing a New Method of Evaluat~~ion~~ING

Your Job Performance

Dangerous	_____	_____	_____	_____	_____	_____	_____	Safe
	extremely	quite	slightly	neither	slightly	quite	extremely	
Decisive	_____	_____	_____	_____	_____	_____	_____	Indecisive
	extremely	quite	slightly	neither	slightly	quite	extremely	
Skilled	_____	_____	_____	_____	_____	_____	_____	Unskilled
	extremely	quite	slightly	neither	slightly	quite	extremely	
Awful	_____	_____	_____	_____	_____	_____	_____	Nice
	extremely	quite	slightly	neither	slightly	quite	extremely	
Kind	_____	_____	_____	_____	_____	_____	_____	Cruel
	extremely	quite	slightly	neither	slightly	quite	extremely	
Pleasant	_____	_____	_____	_____	_____	_____	_____	Unpleasant
	extremely	quite	slightly	neither	slightly	quite	extremely	
Unfair	_____	_____	_____	_____	_____	_____	_____	Fair
	extremely	quite	slightly	neither	slightly	quite	extremely	
Valuable	_____	_____	_____	_____	_____	_____	_____	Worthless
	extremely	quite	slightly	neither	slightly	quite	extremely	
Good	_____	_____	_____	_____	_____	_____	_____	Bad
	extremely	quite	slightly	neither	slightly	quite	extremely	

Your Supervisor

Nice	extremely	quite	slightly	neither	slightly	quite	extremely	Awful
Unskilled	extremely	quite	slightly	neither	slightly	quite	extremely	Skilled
Bad	extremely	quite	slightly	neither	slightly	quite	extremely	Good
Stable	extremely	quite	slightly	neither	slightly	quite	extremely	Unstable
Safe	extremely	quite	slightly	neither	slightly	quite	extremely	Dangerous
Cruel	extremely	quite	slightly	neither	slightly	quite	extremely	Kind
Fair	extremely	quite	slightly	neither	slightly	quite	extremely	Unfair
Pleasant	extremely	quite	slightly	neither	slightly	quite	extremely	Unpleasant
Worthless	extremely	quite	slightly	neither	slightly	quite	extremely	Valuable
Decisive	extremely	quite	slightly	neither	slightly	quite	extremely	Indecisive

Your Answers

Awful						
Skilled						
Good						
Dangerous						
Kind						
Unfair						
Unpleasant						
Valuable						
Industrious						

Oldsmobile Supervision Outside of Your Department.

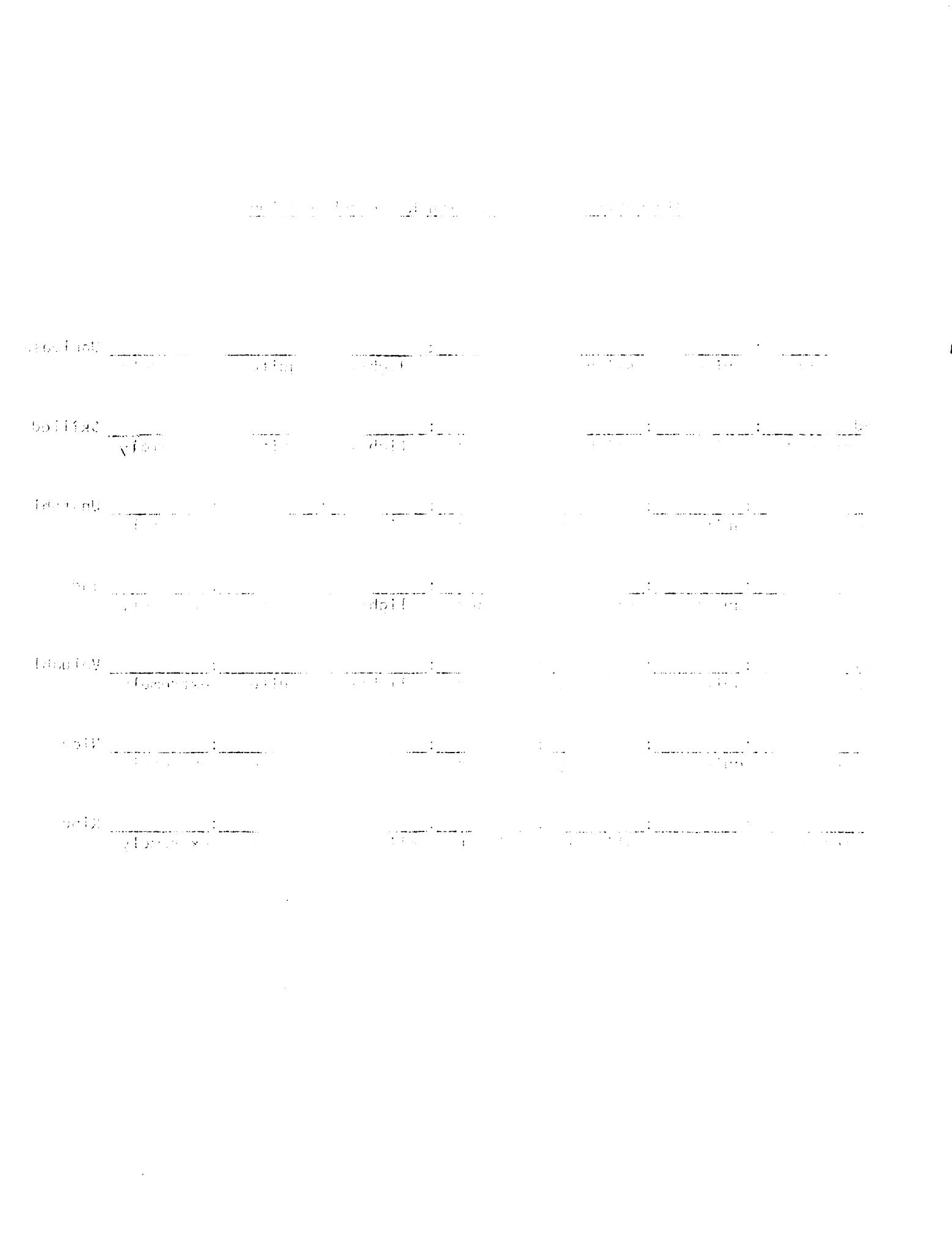
Good	_____	_____	_____	_____	_____	_____	_____	Bad
	extremely	quite	slightly	neither	slightly	quite	extremely	
Stable	_____	_____	_____	_____	_____	_____	_____	Unstable
	extremely	quite	slightly	neither	slightly	quite	extremely	
Unfair	_____	_____	_____	_____	_____	_____	_____	Fair
	extremely	quite	slightly	neither	slightly	quite	extremely	
Safe	_____	_____	_____	_____	_____	_____	_____	Dangerous
	extremely	quite	slightly	neither	slightly	quite	extremely	
Indecisive	_____	_____	_____	_____	_____	_____	_____	Decisive
	extremely	quite	slightly	neither	slightly	quite	extremely	
Awful	_____	_____	_____	_____	_____	_____	_____	Nice
	extremely	quite	slightly	neither	slightly	quite	extremely	
Cruel	_____	_____	_____	_____	_____	_____	_____	Kind
	extremely	quite	slightly	neither	slightly	quite	extremely	
Valuable	_____	_____	_____	_____	_____	_____	_____	Worthless
	extremely	quite	slightly	neither	slightly	quite	extremely	
Pleasant	_____	_____	_____	_____	_____	_____	_____	Unpleasant
	extremely	quite	slightly	neither	slightly	quite	extremely	
Unskilled	_____	_____	_____	_____	_____	_____	_____	Skilled
	extremely	quite	slightly	neither	slightly	quite	extremely	

Please rate how well each statement describes you.

	Not at all	Slightly	Moderately	Very	Extremely
I am kind					
I am sympathetic					
I am warm					
I am compassionate					
I am considerate					
I am helpful					
I am thoughtful					
I am generous					
I am forgiving					

Oldsmobile Data Processing Key Punch Section

Pleasant	extremely	quite	slightly	neither	slightly	quite	extremely	Unpleasant
Unskilled	extremely	quite	slightly	neither	slightly	quite	extremely	Skilled
Stable	extremely	quite	slightly	neither	slightly	quite	extremely	Unstable
Good	extremely	quite	slightly	neither	slightly	quite	extremely	Bad
Worthless	extremely	quite	slightly	neither	slightly	quite	extremely	Valuable
Awful	extremely	quite	slightly	neither	slightly	quite	extremely	Nice
Cruel	extremely	quite	slightly	neither	slightly	quite	extremely	Kind



Oldsmobile Data Processing Department

pleasant	_____	_____	_____	_____	_____	_____	_____	Pleasant
	extremely	quite	slightly	neither	slightly	quite	extremely	
Good	_____	_____	_____	_____	_____	_____	_____	Bad
	extremely	quite	slightly	neither	slightly	quite	extremely	
Valuable	_____	_____	_____	_____	_____	_____	_____	Worthless
	extremely	quite	slightly	neither	slightly	quite	extremely	
nskilled	_____	_____	_____	_____	_____	_____	_____	Skilled
	extremely	quite	slightly	neither	slightly	quite	extremely	
Unfair	_____	_____	_____	_____	_____	_____	_____	Fair
	extremely	quite	slightly	neither	slightly	quite	extremely	
Decisive	_____	_____	_____	_____	_____	_____	_____	Indecisive
	extremely	quite	slightly	neither	slightly	quite	extremely	
Cruel	_____	_____	_____	_____	_____	_____	_____	Kind
	extremely	quite	slightly	neither	slightly	quite	extremely	
Nice	_____	_____	_____	_____	_____	_____	_____	Awful
	extremely	quite	slightly	neither	slightly	quite	extremely	
Unstable	_____	_____	_____	_____	_____	_____	_____	Stable
	extremely	quite	slightly	neither	slightly	quite	extremely	

Oldsmobile Division - General Motors Corporation

Pleasant	_____	_____	_____	_____	_____	_____	_____	Unpleasant
	extremely	quite	slightly	neither	slightly	quite	extremely	
Dangerous	_____	_____	_____	_____	_____	_____	_____	Safe
	extremely	quite	slightly	neither	slightly	quite	extremely	
Unskilled	_____	_____	_____	_____	_____	_____	_____	Skilled
	extremely	quite	slightly	neither	slightly	quite	extremely	
Stable	_____	_____	_____	_____	_____	_____	_____	Unstable
	extremely	quite	slightly	neither	slightly	quite	extremely	
Worthless	_____	_____	_____	_____	_____	_____	_____	Valuable
	extremely	quite	slightly	neither	slightly	quite	extremely	
Kind	_____	_____	_____	_____	_____	_____	_____	Cruel
	extremely	quite	slightly	neither	slightly	quite	extremely	
Fair	_____	_____	_____	_____	_____	_____	_____	Unfair
	extremely	quite	slightly	neither	slightly	quite	extremely	
Awful	_____	_____	_____	_____	_____	_____	_____	Nice
	extremely	quite	slightly	neither	slightly	quite	extremely	
Bad	_____	_____	_____	_____	_____	_____	_____	Good
	extremely	quite	slightly	neither	slightly	quite	extremely	
ecisive	_____	_____	_____	_____	_____	_____	_____	Indecisive
	extremely	quite	slightly	neither	slightly	quite	extremely	

Name:_____ Seniority date:
(Month and Year):_____

Shift:

Days _____

Afternoons _____

Which type of work do you do the most?

Key Punching _____

Verifying _____

About equal _____

As a general evaluation, how would you rate your job performance? (If less than one year's seniority, compare yourself to others with comparable seniority).

bad _____:_____:_____:_____:_____:_____:_____ good
extremely quite slightly neither slightly quite extremely

How do you think your supervisor would rate your job performance?

bad _____:_____:_____:_____:_____:_____:_____ good
extremely quite slightly neither slightly quite extremely

You will be contacted in a few weeks, either singly or in small groups, to learn the results of this evaluation.

Thank you for your assistance today.

APPENDIX B 1-6

EXPERIMENTAL MESSAGES

In order to better evaluate the Data Processing Key Punch Activity, a new method of employee rating will be introduced during the month of April.

For each employee, there are two ratings available: an "Efficiency Score", ranging from -4 to +4 (with -4 being very poor, 0 average, and +4 very good), and an "Effective Productivity Score", expressed in percentages ranging from 0 to 100 (with 0 being very poor, 50 average, and 100 very good).

You will be rated with the "Efficiency Score", and will be told of your initial score, in private, early next week.

If you have any questions, please feel free to ask them now.

General Supervisor
Data Processing Operations

In order to better evaluate the Data Processing Key Punch Activity, a new method of employee rating will be introduced during the month of April.

For each employee, there are two ratings available: an "Efficiency Score", ranging from -4 to +4 (with -4 being very poor, 0 average, and +4 very good), and an "Effective Productivity Score", expressed in percentages ranging from 0 to 100 (with 0 being very poor, 50 average, and 100 very good).

You will be rated with the "Effective Productivity Score", and will be told of your initial score, in private, early next week.

If you have any questions, please feel free to ask them now.

General Supervisor
Data Processing Operations

In order to better evaluate the Data Processing Key Punch Activity, a new method of employee rating will be introduced during the month of April.

For each employee, there are two ratings available: an "Efficiency Score", ranging from -4 to +4 (with -4 being very poor, 0 average, and +4 very good), and an "Effective Productivity Score", expressed in percentages ranging from 0 to 100 (with 0 being very poor, 50 average, and 100 very good).

In the following space, please check which of the two scores you would prefer to be rated with:

A: Efficiency Score _____.

B: Effective Productivity Score _____.

In the interests of time, you will be told of your initial score in a small group from three to six employees, early next week.

If you have any questions, please feel free to ask them now.

General Supervisor
Data Processing Operations

In order to better evaluate the Data Processing Key Punch Activity, a new method of employee rating will be introduced during the month of April.

For each employee, there are two ratings available: an "Efficiency Score", ranging from -4 to +4 (with -4 being very poor, 0 being average, and +4 very good), and an "Effective Productivity Score", expressed in percentages ranging from 0 to 100 (with 0 being very poor, 50 average, and 100 very good).

In the following space, please check which of the two scores you would prefer to be rated with:

A: Efficiency Score _____.

B: Effective Productivity Score _____.

You will be told of your initial score, in private, early next week.

If you have any questions, please feel free to ask them now.

General Supervisor
Data Processing Operations

In order to better evaluate the Data Processing Key Punch Activity, a new method of employee rating will be introduced during the month of April.

For each employee, there are two ratings available: an "Efficiency Score", ranging from -4 to +4 (with -4 being very poor, 0 average, and +4 very good), and an "Effective Productivity Score", expressed in percentages ranging from 0 to 100 (with 0 being very poor, 50 average, and 100 very good).

You will be rated with the "Effective Productivity Score", and in the interests of time, will be told of your initial score in a small group of from three to six other employees, early next week.

If you have any questions, please feel free to ask them now.

General Supervisor
Data Processing Operations

In order to better evaluate the Data Processing Key Punch Activity, a new method of employee rating will be introduced during the month of April.

For each employee, there are two ratings available: an "Efficiency Score", ranging from -4 to +4 (with -4 being very poor, 0 average, and +4 very good), and an "Efficetive Productivity Score", expressed in percentages ranging from 0 to 100 (with 0 being very poor, 50 average, and 100 very good).

You will be rated with the "Efficiency Score", and in the interests of time, will be told of your initial score in a small group of from three to six other employees, early next week.

If you have any questions, please feel free to ask them now.

General Supervisor
Data Processing Operations

APPENDIX C

POSTTEST ATTITUDE INSTRUMENT

Your Job At Oldsmobile Division

General Motors Corporation

Valuable	_____	_____	_____	_____	_____	_____	_____	Worthless
	extremely	quite	slightly	neither	slightly	quite	extremely	
Unpleasant	_____	_____	_____	_____	_____	_____	_____	Pleasant
	extremely	quite	slightly	neither	slightly	quite	extremely	
Awful	_____	_____	_____	_____	_____	_____	_____	Nice
	extremely	quite	slightly	neither	slightly	quite	extremely	
Good	_____	_____	_____	_____	_____	_____	_____	Bad
	extremely	quite	slightly	neither	slightly	quite	extremely	

The New Method of Evaluating

Your Job Performance

Good	_____	_____	_____	_____	_____	_____	_____	Bad
	extremely	quite	slightly	neither	slightly	quite	extremely	
Pleasant	_____	_____	_____	_____	_____	_____	_____	Unpleasant
	extremely	quite	slightly	neither	slightly	quite	extremely	
Worthless	_____	_____	_____	_____	_____	_____	_____	Valuable
	extremely	quite	slightly	neither	slightly	quite	extremely	
Nice	_____	_____	_____	_____	_____	_____	_____	Awful
	extremely	quite	slightly	neither	slightly	quite	extremely	

Name: _____ Seniority Date:_____

Shift:

Days	_____	Key Puncher	_____
Afternoons	_____	Verifier	_____

As a general evaluation, how would you rate your job performance?

Good _____:_____:_____:_____:_____:_____:_____ Bad
extremely quite slightly neither slightly quite extremely

How do you think your supervisor would rate your job performance?

Good _____:_____:_____:_____:_____:_____:_____ Bad
extremely quite slightly neither slightly quite extremely

Check on the following scale how much choice you feel you had in what you did here today.

Little_____:_____:_____:_____:_____:_____:_____ Much
extremely quite slightly neither slightly quite extremely

Please verify that you have made 13 check marks in this booklet, and then place the booklet in the envelope matching the code that appears on the first page of the booklet.

Thank you.

APPENDIX D

PRETEST

DEPARTMENTAL PRODUCTIVITY DISTRIBUTIONS

PRETEST PRODUCTIVITY DISTRIBUTIONS*

Job Classification	Mean	Standard Deviation	N
Verifiers	15189	2792	60**
Key Punchers	10776	1890	63***
Beginners:			
Month 1	5281	1452	46
Month 2	6740	1625	45
Month 3	7172	1723	41
Month 4	7402	1807	42
Month 5	8067	1949	40
Month 6	8457	1747	39
Month 7	8409	2053	38
Month 8	9105	2262	37
Month 9	8810	1573	36
Month 10	9023	1640	34
Month 11	9409	1730	33
Month 12	9549	2073	26

*Observational periods: verifiers and key punchers, November and December, 1965, January, 1966. Beginners: 1961-1965, by consecutive months, first year on job.

**N of 60 based on 20 subjects, 3 observations each.

***N of 63 based on 21 subjects, 3 observations each.