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AN ANALYSIS OF THE EFFECT OF DAILY PERFORMANCE FEEDBACK
AND CONTINGENT SUPERVISORY PRAISE ON PERFORMANCE IN AN
INDUSTRIAL WORK SETTING

A Dissertation Presented

By

Thomas E. Loper

Submitted to the Graduate School of the
University of Massachusetts in partial fulfillment
of the requirements for the degree of

DOCTOR OF EDUCATION

September 1980

School of Education

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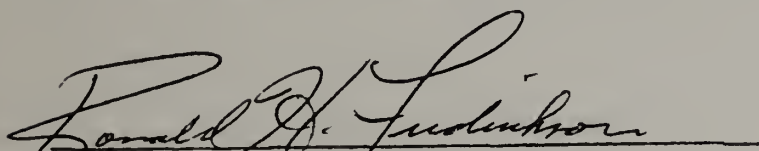
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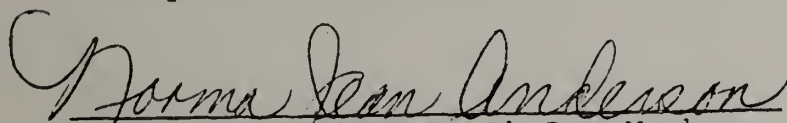
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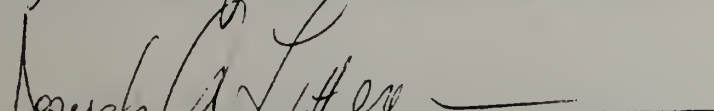
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DEDICATION

On numerous occasions during the past few years, my wife has referred to me as "the Juggler". At any given moment, I have behaved as if there were two balls in the air and one in my hand. We've laughed more than once at this simple analogy. Somehow it has given all the "craziness" some meaning and allowed us to tolerate a very difficult period in our lives.

The first ball, if you will, was the University. Here was the source of my learning; the foundation for a dream; the beginning of a meaningful career in a fascinating new field. I loved it.

The second was usually my job, or jobs, as was more often the case. From internal to external O.D. consultant to trainer, to manager, to counselor, et. al. In search of business experience in organization development, I took on the pyramids.

The third ball, interestingly enough, was my family. My wonderful wife and two daughters -- Kit, Alexis and Courtney. We grew a lot together and had many great times. But on far too many occasions, they experienced the Juggler's dazed eyes and curious smile; they certainly deserved more than this.

Like any juggler, I've often been amazed by my ability to keep it all going at the very same time. Perhaps I've even entertained a few passers-by with my unusual show. But now the time has come to run away from this circus and join a town; to sit down in the bleachers and watch for a while.

With the completion of this dissertation, I'm giving up the show; my juggling will come to an end. Thank God for this blessing. It's time for the family! To them and to this purpose, I dedicate this work.

A C K N O W L E D G E M E N T S

I did not take on this academic challenge by myself. Many people were always there to help me along the way. Without their assistance, I would not have been able to answer the many questions I brought to Amherst with me nearly five years ago: questions about human behavior, business and industry, organization development, and my professional skills and abilities. My sincere thanks to everyone for being so helpful and so kind.

I am particularly indebted to each of the following individuals for their extraordinary support. They've helped me to establish a strong foundation for my career and I shall remain forever grateful to them for it.

To Dr. Ron Fredrickson, Chairperson of my Committee, for guiding me through learning experience after learning experience; for keeping his standards very high; and for helping me to realize my academic potential. I believe that I am a better person for having known Ron so well.

To Dean Norma Jean Anderson, for convincing me to pursue my studies in organization development at the School of Education, University of Massachusetts, Amherst. Norma Jean is a consultant's consultant; an inspiration for us all.

To Dr. Joseph Litterer, for always reminding me, with his deeds as well as his words, of the reasons for sticking to a career in organization development. He has clearly improved the quality of work life for thousands of people. I hope that I can remember half of what he has shown me about integrating the needs of people with the needs of their organizations.

To Mr. Walt Smith and his management team, including Tony Barabani, Deborah Ramah, Jake Schmidt, Joe Nelson, John Jawarek, John Saletnik, Jim Raby, Michelle Guertin, and Kevin Fandel for opening up so many doors for my research, and then helping me to carry it through.

To the employees who participated in the study. I sincerely hope that my work has somehow served to improve the quality of work life in your department as well as your performance.

And finally, to my wife, Kit, who laboriously supported me through two comprehensive papers, a proposal, and many revisions of this dissertation. I never knew what I was asking her for when I decided to go back to school. It's now very clear to us why they call this a terminal degree.

ABSTRACT

An Analysis of the Effect of Daily Performance Feedback And Contingent Supervisory Praise on Performance in an Industrial Work Setting

September 1980

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Directed by: Professor Ronald H. Fredrickson

A study of operant conditioning procedures as a means of improving performance in an industrial work group. The experimental group was composed of thirty-four female, unskilled employees from the metals assembly department of a large New England ring-binder manufacturer. An A-BC-A-BC experimental design was employed.

The interventions (BC) consisted of the presentation of performance feedback by a supervisor to all members of the work group on a daily basis. Supervisory praise was also provided on a daily basis to all employees who demonstrated quota accomplishment and/or any degree of performance improvement on the previously recorded work day.

The results indicate that the feedback-praise intervention did have some impact on the overall work group, but not as significant an impact as was anticipated. Further analysis

of the data, however, indicates that the performance of the subjects varied considerably along demographic lines. Position within salary range, for example, was a particularly significant factor in this study. The lower paid subjects improved their performance considerably, while their higher paid peers reduced their performance during the same time frame.

The relative impact of the feedback-praise intervention on individual subjects was also examined. Interestingly enough, only six of the thirty-four subjects were significantly affected by the treatment throughout all experimental stages.

While the limitations in this study prevent further generalization of the results, it is reasonable to conclude that (1) feedback-praise interventions can be used to generate performance improvement in a complex industrial work environment; (2) that demographic segmentation of the work force can enhance predictability; and (3) that feedback-praise is not universally reinforcing. Implications for management and for future research are discussed.

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CHAPTER I

Introduction

The use of behavior modification in applied settings has been the subject of considerable discussion and study in recent years (Kazdin, 1978; Hersen & Barlow, 1976, Presbie and Brown, 1976; Kazdin, 1975; Bandura, 1969). While most of the attention has been directed towards applications of reinforcement systems in treatment and educational settings, an increasing number of articles are now being devoted towards similar applications in the world of work (Dowling, 1978; Miller, 1978; Luthans & Kreitner, 1975; Luthans, 1976; Lazer, 1975; Schneier, 1974; Porter, 1973; Whyte, 1972; Jablonsky & DeVries, 1972; and Nord, 1969).

Of particular interest, because of their broad applications, reported achievements and apparent cost effectiveness are those behavior modification interventions which have utilized performance feedback and supervisory praise to reinforce and maintain performance improvements in the industrial work setting. These interventions have been designed to improve performance by changing both the way workers learn about how they are actually performing on the job, and the manner in which they are reinforced by their supervisors for performance improvement. Business Week

(January, 1978) reported that more than 100 major companies were then known to be using behavior modification techniques of this kind to "combat slumping productivity growth rates, reduce absenteeism and turnover, and, in most cases, provide increased job satisfaction for employees."

A survey by Hamner & Hamner (1976), later supported by Miller (1978), indicates that literally millions of dollars of savings have been attributed to behavior modification programs by a wide variety of companies including Emery Freight, General Electric, ACDC Electronics, Standard Oil of Ohio, B.F. Goodrich Chemical Co., J.P. Stevens & Company, Inc., and others. Examples range from a \$3 million savings on numerous programs at Emery to more than \$20 million savings on earnings by one of the largest textile firms.

With these kinds of figures, it is not surprising to find that there are now more than a dozen business consulting firms throughout the nation specializing in behavior modification programs; that a new journal, determined to "advance the knowledge of applied behavior analysis in work and organizational settings", the Journal of Organizational Behavior Management has been established (1978); and that courses on behavior modification techniques, et.a., at the School of Business, University of Michigan, and elsewhere are reportedly

overflowing.

What is surprising, however, is the relative dearth of empirical evidence available to support the contention that it is, in fact, the behavior modification programs which are responsible for these and other reported improvements in performance. To date, the literature provides little more than case studies with A-B (before and after) comparisons as evidence of the causal relationships between behavior modification programs and performance improvement. While case studies can help to foster procedural innovations, cast doubt on theoretical assumptions and theoretical views, etc., (Lazarus & Davison, 1971), they are not sufficient to isolate and demonstrate the efficacy of an operant-based change effort (Komaki, 1977; Hersen & Barlow, 1976; Campbell & Stanley, 1969; Sidman, 1960). Even when improvements in performance can be demonstrated, it cannot be concluded that the intervention is the cause under these conditions. Other plausible alternatives must first be ruled out before change of any kind can be attributed directly to the change technology.

This study closely examines the functional relationship between a feedback-praise program (the most frequently utilized behavior modification intervention in the literature) and performance by minimizing the range of alternative

explanations possible. During the course of the study, thirty-four employees of a New England industrial firm were provided with performance feedback from their supervisor on a daily basis. In addition, all workers who performed at or above their assigned quota (100%), and those who showed any degree of performance improvement for any given day over the previously recorded and processed work day, received praise from their supervisor at the same time. Strict controls were imposed on these independent variables throughout the study.

This study addresses three substantive questions: 1. To what extent, if any, will daily performance feedback and contingent praise from a superior impact on the overall performance of a group of unskilled employees in a complex industrial work environment? 2. To what extent, if any, will the treatment impact differently on the performance of selected demographic segments of the work group, e.g. subjects with different job classifications, time with company, position in the salary range, dates of birth, etc.? 3. To what extent, if any, will the impact of this treatment on individual employees be consistent with its impact on the overall work group?

C H A P T E R I I

Literature Review

Most organizations are continuously searching for better ways to solve performance problems and achieve their goals. Over the past two decades, an increasing number of business organizations have been turning to the behavioral sciences for insights into how this can best be accomplished. The variety of behavioral approaches to planned organizational improvement which have evolved are loosely referred to today as organization development techniques, or simply O.D. (Bowers, 1976).

Applications of behavior modification in the industrial work environment should therefore be reviewed within the context of the O.D. literature. By definition, this would appear to be a reasonable conclusion. As a matter of practice, however, behavior modification has as many differences from the traditional O.D. techniques as it does similarities. The essence of these similarities and differences are discussed in the first half of this chapter. In the process, the operant principles upon which behavior modification is based are presented; along with suggested applications of these principles as they have evolved in the management

literature. The second half of the chapter focuses more specifically on a number of behavior modification studies which have been conducted in the business and industrial work environment in recent years.

Behavior Modification as an Organization Development Technique

Most traditional organization development techniques approach performance issues in the work environment from a social as well as a technical perspective. Problems confronting the organization are not assumed, a priori, to be ones which can be better understood with more adequate technical information, though this possibility is by no means ruled out. It is assumed that the cause of any problem may lie in the attitudes, values, and norms of the employees and/or the internal and external relationships of the client system (Chin, Benne, 1969). Therefore, solutions to performance problems often require attention to both the social and the technical system.

Some of the more popular O.D. techniques for improving upon the social system have included laboratory training (Dunnette, 1970; Campbell & Dunnette, 1968; Schein & Bennis, 1965), process consultation (Schein, 1969), job enrichment (Rush, 1969; Herzberg, 1968), and survey feedback (Miles,

et.a., 1970). To varying degrees, each of these approaches has employed planned, systematic, action-research (Lewin, 1951; 1958) processes for improving the effectiveness of the client system.

In recent years, behavior modification has been receiving a good deal of attention in the management literature, and in practice. Miller (1978), Luthans & Kreitner (1975), and Schneier (1974) have all suggested that the behavior modification process provides a more predictable and controllable alternative to the more traditionally recognized O.D. techniques described above. While the behavior modification process is similar to the earlier O.D. techniques in that it clearly requires the use of a systematic, action-research methodology, it is distinctively unique in that it shifts the focus of causal analysis of human performance problems away from the hypothesized inner determinants of performance, i.e. values, needs, trust, honesty, et.al., towards a more detailed analysis of measurable, environmental influences on performance. From this environmental perspective, organization behavior is presumed to be contingent upon (1) the antecedent conditions in the organization which set the occasion for specific behavioral responses, and (2) the range of reinforcers, i.e. the consequences of performance,

which can be generated by any given response (Skinner, 1953). Behavior modification, then, involves the systematic management of these behavioral contingencies. This is in marked contrast with the need-satisfaction theories upon which most of the earlier O.D. techniques have been established.

While the traditional O.D. approaches focus on the development of antecedent conditions which can ultimately set the occasion for desired performance (Luthans, 1976), they do not normally focus on the control of the consequences of that performance. Open discussions, role-playing, concepts training, modeling, and systematic problem-solving, et.al., are excellent mechanisms for generating new behaviors, but unfortunately, they are not usually sufficient, in and of themselves, to strengthen and maintain performance improvement over time. It would appear that in this respect, more than any other, that behavior modification may ultimately serve to enhance the predictability and control of O.D. activities.

The operant conditioning model, upon which behavior modification principles are established, assumes that behavior is ultimately controlled by the consequences it is able to generate in its environment. Individuals tend to repeat those behaviors which result in favorable consequences and avoid repeating behaviors which result in unpleasant conse-

quences (Skinner, 1953; Thorndike, 1913). By controlling the consequences of behavior, it is therefore possible to modify performance considerably over time.

Behavior modification has been studied and used extensively in both treatment and educational settings for approximately thirty years (Kazdin, 1978; Kazdin, 1975; Hersen & Barlow, 1976; Presbie & Brown, 1976; Bandura, 1969). Within these limited and controlled environments, its value as a performance improvement technique has been clearly documented. By manipulating environmental stimuli, researchers and practitioners have been able to systematically generate and maintain rather complex human behaviors while extinguishing others. Today, behavior modification is a generally accepted technique for both behavior therapy and classroom management.

One of the first articles published in the management literature advocating the use of behavior modification in the work setting was Owen Aldis' paper entitled "Of Pigeons and Men" (1961). Aldis felt that piece rates should be used more extensively in industry, since they would offer the immediacy of reinforcement dictated by the operant conditioning model. He also pointed out the overemphasis on punishment, as opposed to positive reinforcement, for the control of work behavior. He saw the challenge as being the motivation

of workers by positive rewards rather than by negative punishments or threats of punishment.

Nord (1969) presented the most extensive early proposal for the use of behavior modification in industry. Nord offered the operant conditioning model as an alternative to the normative, re-educative theories of McGregor (1960) and Herzberg (1968). Whereas McGregor and Herzberg suggested "job enlargement" and "job enrichment" as strategies for increasing employee motivation (an internal state), Nord ignored the internal state and explained the results presented by McGregor and Herzberg in terms of contingencies of reinforcement. He translated increased "motivation" into objectively measurable criteria, e.g. higher rates of desired behavior resulting from the reinforcers these behaviors were able to generate in the work environment.

Building upon Nord's alternative explanation of organizational functioning, Jablonsky and DeVries (1972) introduced several additional points regarding applications of the operant conditioning paradigm in the industrial work setting. Very importantly, they pointed up the high potential for multiple reward and punishment contingencies for any given worker. An employee's work-related behaviors can be influenced by the supervisor, the peer group, union officials, and others.

Any viable change strategy must, therefore, address each of these contingencies. These important observations by Jablonsky and DeVries were unfortunately overshadowed by other conceptually incorrect statements regarding negative reinforcement and cognitive mediation (Heinman, 1975).

Schneier (1974) reviewed the management literature on the use of behavior modification and found that within the prior decade, there had been a shift from those articles which had simply noted the potential of behavior modification for controlling work behavior to those which discussed actual applications at the work site. He noted that the most common applications involved programmed instruction techniques for training purposes.

Programmed instruction is based on a learning strategy in which the operant principles of reinforcement are used. The trainee receives immediate feedback regarding the correctness of his responses. Correct response enables the trainee to continue, while incorrect responses signal a re-routing process through the material until the trainee has given evidence, by correct responses, that he has learned the material (p. 538).

Schneier also noted that at General Electric, the use of modeling plus video-taped feedback has been used for some time as a means of modifying the performance of supervisors. The learning begins with a video-tape of a model

demonstrating the proper use of a particular skill in an actual job situation (i.e. antecedent stimuli). Trainees are encouraged to act in the successful or desired manner shown in the film. Positive reinforcement is then provided once the goal of successful display of the behavior is made in a role-play situation (i.e. consequence). Once again, the model for operant conditioning, i.e. behavior modification, has been closely followed.

Finally, Schneier cited the highly publicized experiences of Edward Feeney at Emery Air Freight Company (Organization Dynamics, 1973) as an example of the potential of behavior modification for changing an entire class of behaviors within an organization.

Feeney gave feedback to employees to show them how their actual performance differed from their own perceptions and from company standards. This performance audit enabled employees to change their behavior in the proper direction and to receive positive reinforcement for their efforts, and it enabled the company to better specify proper performance standards.

A savings of more than \$3 million has been realized since the inception of that program back in 1969. As a result, the program has been expanded from the shipping area to the sales and customer service areas as well. John C. Emery, President of Emery Air Freight has commented:

Positive reinforcement, always linked to feedback systems plays an important role in performance improvement at our company. All managers and supervisors are being trained via self-instructional programmed instruction texts - one on feedback and one on positive reinforcement. No formal off-the-job training is needed. Once he has studied the texts, the supervisor is encouraged to immediately apply the learning to the performance area for which he is responsible (Hamner & Hamner, 1976).

Ten similar case studies were later reviewed by Hamner & Hamner (1976). Each study suggested that behavior modification programs, employing performance feedback and a wide range of positive reinforcers, has been used to generate and maintain performance improvement from adult workers in a variety of routine work situations. Examples of the industrial programs included in the review are provided in Table 1.

TABLE 1

Examples of Behavior Modification

Programs and Their Results*

Company	Independent Variables	Dependent Variables	Results
General Electric (1973-76)	Feedback, praise	Productivity, labor costs	Positive (no details provided)

TABLE 1 (Cont'd.)

Company	Independent Variables	Dependent Variables	Results
B.F. Goodrich Chemical (1972-76)	Praise, recognition, freedom to choose one's own activity	Productivity	Positive production increased more than 300%
ACDC Electronics Division of General Electric (1974-76)	Positive feedback	Turnaround time	Positive turnaround time went from 30 to 10 days

*Adapted from Hamner & Hamner (1976)

Hamner & Hamner found that the more effective programs had three specific conditions in common.

First, reinforcers were selected that were sufficiently powerful and durable to establish and strengthen behavior; second, the manager designed the contingencies in such a way that the reinforcing events were made contingent upon the desired level of performance; third, the programs were designed in such a way that it was possible to establish a reliable training procedure for inducing the desired response patterns (p. 20).

Luthans & Kreitner (1975) have proposed a very similar methodology for behavior modification programs in organizations. Clearly consistent with the action-research methodology proposed for O.D. by Lewin (1951; 1948), as well as the four-stage approach uncovered by Hamner & Hamner (above), the five-step model represents a clear path for

the application of behavior modification as an O.D. alternative for business and industry. A detailed outline of this change process and the rationale for each step follows.

Step 1 - Identification of performance-related behaviors.

The objective of this step is to identify all behaviors related to a job which have a significant impact upon performance. Through some type of performance audit, behaviors which critically impact upon job performance, both positively and negatively, must be carefully identified. This is not always an easy task to accomplish, but through the use of traditional job analysis techniques (e.g. time study) and new appraisal techniques, such as behaviorally anchored rating scales, it is possible to systematically identify the critical behaviors of any given job. By accelerating desirable behaviors and decelerating undesirable behaviors, significant performance improvement can be realized.

Step 2 - Establish a baseline of performance.

The second step in the model recognizes the need for objective measurement. The frequency of the full range of behaviors identified in Step 1 must be measured under existing conditions in the organization. Whenever possible, the measurement of behaviors should be obtained from existing

data such as absenteeism reports, time sheets, and other elements of the established management information system. A variety of self-counting and audio-visual measurement techniques may be employed.

Step 3 - An analysis of the behavioral contingencies.

From a behavioral perspective, the performance behaviors identified in Step 1 and measured in Step 2 are contingent upon (1) the antecedent stimuli in the work environment which set the occasion for that performance, and (2) the consequence which the performance is able to generate in that work environment. It is therefore necessary to identify these contingencies, as they exist during baseline conditions, prior to the development of any form of performance improvement program.

Miller (1978) states that antecedents may be derived from the physical setting, the social setting, the behavior of other persons, the employee's own thoughts and feelings, and the employee's previous behavior. Each of these stimuli will generate specific behaviors, depending upon the employee's prior reinforcement or punishment in the presence of these conditions.

Examples of antecedent conditions in the work environment

which are often noteworthy include (1) the availability of materials and equipment needed to complete an assignment, (2) the physical characteristics of the work place, e.g. temperatures, lighting, noise levels, etc., (3) the proximity of other employees and the opportunity to communicate freely with them, (4) the manner in which guidance and directions are provided, (5) the employees personal experiences with their friends, families, and other employees, and (6) the employees previous experience under similar working conditions. All of these factors, and more, should be carefully examined and understood before any plans for performance improvement are developed.

Since organizational behavior is ultimately controlled by consequences, it is also necessary to identify the types of consequence available to the employees under baseline conditions. Can performance improvement generate some form of positive reinforcement? Or will it simply be ignored? For that matter, will it be punished? The availability of consequence which will ultimately strengthen and maintain desired performance is a critical issue in the behavior modification process.

When behavior is positively reinforced, there is an increased probability that the behavior will re-occur. For

this reason, the availability of positive reinforcement as a consequence of performance improvement is of fundamental importance. Porter (1973) identified the following types of reinforcers and their sources as being typically available in the working environment.

TABLE 2

Types of Reinforcers and Their Source
Typically Available in the Work Setting

<u>Type</u>	<u>Source</u>			
	Organi- zation	Super- visor	Work Group	Indi- vidual
Financial				
1. Wages	X			
2. Benefits	X			
Interpersonal				
3. Status	X	X	X	
4. Recognition (praise)	X	X	X	
5. Friendship		X	X	
Intrinsic to work				
6. Completion	(X)	(X)		X
7. Achievement	(X)	(X)		X
8. Energy expenditure	(X)	(X)		X
Developmental				
9. Skill acquisition	(X)	(X)		X
10. Personal growth	(X)	(X)		X

X = Direct Source
(X) = Indirect Source

During Step 3, it is necessary to determine the degree to which these consequences are utilized as reinforcers in the client system.

Conversely, it is also necessary to identify the degree to which punishment and negative reinforcement are used to control behavior in the work setting. Punishment results in a decreased probability that the employee will exhibit certain behaviors on the job, and this immediate reduction in the punished behavior is all many supervisors need to reinforce its continued use. Along these same lines, employees will work very hard to avoid punishment, thus providing even further reinforcement for its usage by supervisors.

The short term benefits of this aversive control to the supervisor have made its usage common-place in the world of work. However, the long term impact of such consequence can seriously undermine the effectiveness of any organization as it is pointed out by Schneier (1974):

Punishment leads to attempts to escape or avoid the aversive consequences of behavior. These attempts often manifest themselves as tardiness, absenteeism and turnover in work settings, rather than escape or avoidance of punishment by behaving correctly (i.e. negative reinforcement). In addition, the undesired behaviors, because they are not extinguished, but merely suppressed by punishment, are often emitted when

the punishing agent, e.g. the supervisor, is absent. Hence, punishment can be effectively avoided without a change of desired behavior. The over-reliance on punishment in controlling performance has led to several pleas for the responsible use of positive reinforcement in industry (p.532).

Once the antecedents and consequences of performance have been fully understood, a plan of action can be developed which will re-structure the environment such that more desirable performance will be generated and maintained over time. Through the use of positive behavior modification programs, more viable and effective contingencies of reinforcement can be established.

Step 4 - Developing an intervention strategy.

The analysis of the antecedent stimuli may indicate that one or more of the more traditional organization development techniques may be appropriate. Job enrichment and systematic problem-solving actually structure the environment such that more desirable employee behaviors will be emitted. Laboratory training and role-playing can also set the occasion for the presentation of desirable behavior. Concepts training, modeling, and/or a wide range of audio-visual cues may also be appropriate.

The analysis may also reveal that a wide range of tech-

nical problems, such as materials shortages or equipment breakdown, will also need to be addressed as an integral part of the performance improvement process. The engineering of these social and technical changes will, of course, have to be organized into a meaningful sequence of events.

Once the antecedent conditions have been structured such that desired behavior will be generated, operant technology can then be utilized to strengthen and maintain the desired performance and minimize and/or eliminate any undesirable performance.

B.F. Skinner (1972) urges the maximum use of positive reinforcement to modify organization behavior. He suggests, however, that we make certain that the reinforcement is truly contingent upon the presentation of the desired performance.

Even the wages we pay are not effective as positive reinforcers. An employee does not come to work on Monday morning because he is reinforced for doing so by the money he gets at five o'clock on Friday afternoon. He'd be a fool to do that. He works on Monday to keep from being fired. The weekly salary gives him a standard of living, and as a result, a supervisor who stands over him can threaten him with loss of that standard. The whole thing looks like positive reinforcement, but it is primarily aversive control (p. 71).

The selection of consequences which will, in fact, be reinforcing to employees is not always easy. Alternatives

which come quickly to mind are money, working conditions, and fringe benefits; the traditional human relations motivators. Upon closer examination, however, it turns out that these are seldom effective as reinforcers because they are usually administered on a noncontingent basis. Fred Luthans (1976) suggests that, as a much more cost effective alternative there are "natural reinforcers" in every organization which can be extremely potent and cost the organization nothing to administer.

The important and very powerful natural reinforcers which can be effectively used in a behavioral change strategy include attention (or recognition) and feedback. Attention contingently applied can have a very accelerating effect on behavior. The same is true of feedback. Although management information systems are in most cases supplying an avalanche of job-related data, individual employees still have little feedback on how they are doing. Contingently giving specific feedback can be very reinforcing for individual or group behaviors (p. 19).

The use of such natural reinforcers is becoming more and more extensive as indicated by Miller (1978).

The reinforcing consequence most commonly used in behavior management is visualized feedback or knowledge of results. Managers often use the graph of the baseline data they have plotted to illustrate a good level of performance and either post the graph in a visible location in the work area or personally show it to the

worker whose performance is being recorded. The supervisor pairs verbal praise and approval with the visual feedback. This simple procedure has been used literally thousands of times to increase individual workers' productivity.

Lyman W. Porter (1973) adds that organizations will have to be far more creative in order to motivate employees in the future. Several of his recommendations for rewards are quite unique in the literature and could undoubtedly be used to accelerate desired organization behavior in many business organizations. For example, opportunities to schedule one's own work hours; to create new jobs; to participate in bonus drawings; to choose anywhere in the organization to work for a limited period of time; to take educational or civic activity leave; etc. From these examples, it would appear that we have barely scratched the surface of possibilities for positive reinforcement in an organization.

Besides selecting appropriate types of reinforcement, it is also necessary to schedule the reinforcement in an appropriate manner. Initially, a continuous schedule may be necessary in order to get the behavior moving in the desired direction. Subsequently, an intermittent schedule should be used which will strengthen the behavior and free up the manager or supervisor to concentrate on other aspects of the

job. The ultimate goal of most behavior modification programs is to have employees become self-reinforced for performance improvement and goal attainment. The schedule of reinforcement employed is a critical issue in this regard.

Step 5 - Evaluating for performance improvement.

The final step in the behavior modification process is to evaluate the overall intervention to ensure that it is, in fact, leading to performance improvement. The baseline frequency of performance determined in Step 2 can help in this evaluation.

In some cases reversals may be attempted (i.e. return to baseline conditions and then back to the intervention) to verify that it was the intervention that is causing the change in performance. Most important, however, is the evaluation that is made on overall performance improvement (Kreitner & Luthans, p. 142).

Such evaluations should, of course, be viewed as more than a "bottom line" assessment. The information which is collected through a systematic evaluation can also serve as criteria for necessary mid-point corrections. Given the complexity of organization behavior and contingencies of reinforcement, it will undoubtedly be many years, if ever, before behavior modification will allow us to successfully modify organization behavior on the first attempt. For some

time to come, the fifth stage of all behavior modification interventions will continue to be absolutely essential, allowing us to re-arrange the environment, when necessary, and "try, try again" to establish more effective contingencies (Presbie & Brown, 1976).

Research on Behavior Modification in Business and Industry

While the complexities of the organization environment will always make it difficult to arrange effective contingencies of reinforcement, it should be possible to utilize similar behavior modification programs, with large numbers of people, to address similar performance problems. In the case studies reviewed by Hamner & Hamner (1976), for example, performance feedback and praise or recognition were frequently found to be potent reinforcers for large numbers of workers performing similar types of tasks. The underlying assumption here, as Luthans & Martinko (1976) point out, is that the reinforcing and punishing properties of stimuli are essentially the same for many organizational participants. This does not deny the individualized nature of reinforcers and punishers, but it does suggest that behavior modification can be applied on a group level to an entire class of behaviors. If behavior modification techniques are to be used effectively

for organization development, then this must be the case. For this reason, a number of authors have called for controlled, scientific field research on behavior modification programs in recent years.

After reviewing the management literature on the use of behavior modification in business and industry, Schneier (1974) found that:

Most of the authors cited in this review who have studied the operant principles as they apply to work behavior have done so in controlled laboratory situations; there is a dearth of empirical work conducted in the field which has been directly concerned with the testing of operant principles as they apply to work behavior.

The lack of empirical field work at present need not persist. The operant model is based on a methodology amenable to experimentation. It emphasizes planning the amounts and schedules of reinforcers, the specification of desired behavior, and accurate recording and observations of behavior. Its essence is rigor and planning. Suggestions on field research with the model are offered by Bijou, Peterson & Ault (1968), Breshell and Burges (1969), and Baer, Wolf and Risley (1970). Much may also be learned from the vast amount of field work that has been done in other types of organizations.

In a later review, advocate Lawrence Miller (1978), supported the need for more research on the efficacy of behavior modification as a performance improvement technique.

Most of the data on behavior management projects in industry present baseline data and postbaseline or intervention data. We may call this an A-B design; there is an A phase, the baseline phase, and a B phase, the intervention phase. The data generally show that performance was at a certain level before the beginning of the procedure and it increased or decreased to another level following the intervention. Unfortunately, these data do not fulfill either of the criteria for acceptable evaluation. We do not know that there is a functional relationship between the independent and dependent variables. Why? The criteria for evaluation here have not been met: control and replicability.

Referring very specifically to the numerous reports of successful applications of behavior modification in various "live" business settings, Androsik (1979) questioned the extent to which these reports actually contribute to our understanding of behavior modification; and more importantly, to what extent do these reports justify the acclaim already received? Stated another way, "to what extent have the reports of successful application of organization behavior modification demonstrated that the imposed treatments have in fact been responsible for the observed effects".

In an attempt to answer these questions, Androsik examined the design integrity and obtained results of recent behavior modification applications in business settings. Seven major journals were comprehensively reviewed yielding 20 recent applications. Each study was then subjected to

methodological and content analysis. The results are summarized below.

One hundred percent of the applications incorporated baseline measurement procedures. Twelve of the twenty (60%) met the systematic intervention criterion to allow confident cause-and-effect statements about single interventions; seven applications (35%) were sufficiently well controlled to permit cause-and-effect statements about multiple interventions. Finally, four of the twenty applications (20%) reported the collection of the follow-up data.

While this review does not present overwhelming evidence in support of the efficacy of behavior modification in business settings, it does show that certain individual and multi-component applications of the technique can impact favorably upon worker performance. Five of these cases are reviewed more thoroughly below; two focusing on absenteeism and three on the improvement of on-the-job performance.

Komaki, Waddel & Pearce (1977).

This study was conducted in a neighborhood grocery store managed by the owner and his son. The subjects of interest were the two male clerk-stockman, ages 25 and 36, who worked full-time in the store. Following the five-step behavior

modification model of Luthans & Kreitner (1975) outlined earlier, the researchers began with the identification of performance related behavioral events. These included coverage of the store, helping customers and stocking shelves. Specific performance goals were established for each set of behaviors. A baseline of performance was then formally established, pointing up gaps between actual and desired performance. The behavioral analysis of baseline behaviors revealed that the primary consequence of engaging in any of the target behaviors was that the owner would stop nagging the clerks. In other words, the clerks were being negatively reinforced for desired performance. It was also discovered that the owner had never specifically outlined what he wanted the workers to do (i.e. antecedent conditions).

A multiple-baseline design across behaviors (Komaki, 1977) was selected for the experiment. During a 30-minute session held at the beginning of each intervention phase, the workers were told exactly what the desired behavior was and what the rationale was for each. Where necessary, modeling and role-playing were utilized. When clerks were given instructions about the first behavior, no mention was made of the second or third behavior until the second and third training sessions, respectively. The consequences consisted

of self-recording, graphed feedback, and time off with pay at the end of each week whenever they attained at least 90% or more of the desired behaviors. A school bell, which rang eight times a day, was used by the workers and researchers as a cue to record.

The performance of the two clerks on the three target behaviors, during a 12-week period of time, improved in accordance with the three intervention phases of the multiple-baseline design and remained at their targeted levels throughout the five-week follow-up period. Following the first intervention, the mean level of performance improved for the first behavior from 53% to 86%, for the second behavior from 35% to 87%, and for the third behavior from 57% to 86%. Although it is not possible to analyze which component or combination of components was responsible for the changes, the results support the efficacy of the goal-clarification, feedback, and reinforcement procedures for improving customer assistance and merchandise supply in a neighborhood grocery store.

Kempen & Hall (1977).

In a far more extensive study, Kempen & Hall significantly impacted on industrial absenteeism in two factories (7,500 workers) utilizing non-monetary privileges and progressive

disciplinary warnings. The subjects of this study were groups of hourly-rated workers represented by national unions, with a different union representing the employees of each plant. An analysis of absence data revealed that the problem was one of duration rather than frequency; that is, a few employees exceeded four occasions of absence per year, but the average number of days lost per employee per year was over fifteen. It became clear that significant improvements in overall attendance could be achieved by modifying the behavior of a minority of employees.

The objective was to recognize and reinforce short term improvements in attendance, especially among employees who had poor long term records. A multiple baseline design across groups was used to evaluate the effects of the experimental interventions. In addition, multiple comparison groups were used to control for the effects of extraneous variables.

An analysis of the baseline absence rates in Plant A revealed that management had maintained a primitive absence control plan which consisted of four steps of progressive discipline, ranging from an informal discussion with the employee to consideration for termination of employment. Plant B had used a similar absence control plan until just prior to baseline. A switch had then been made to an even more aversive

plan which resulted in a week long wildcat strike to protest the "arbitrary and mechanical" nature of the plan. This plan was also terminated and a third plan, the subject of this study, was instituted.

The new plans were announced to employees at Plant A in November of 1974 and to Plant B in August of 1975. In addition to progressive disciplinary procedures for each new occasion of absence, the new plan also included four types of reinforcement for good or improving attendance: (1) freedom from the requirement to "punch" the time clock, (2) earned time off without pay, (3) temporary immunity from discipline regardless of incurred absence, and (4) reduction in position on the disciplinary ladder. Specific contingencies governing each of these consequences were clearly established. The contingencies for disciplinary action were positive reinforcement for the two plants were very similar, but not identical. The key is that each plant "eased up" on the disciplinary contingencies and added the reinforcing contingencies.

After the introduction of the plan, absenteeism in Plant A decreased to below 3%, a rate more than 50% below the historical baseline mean, lower than any rate achieved at the plant during its 18 year history. This mean rate was maintained for almost two years. Absence rates decreased more

immediately at Plant B after introduction of the plan, but appeared to stabilize for the next twelve months at a less satisfactory level (6.7%). Further support of the efficacy of the plan is provided by the lack of any attendance improvement at ten of the eleven comparison plants during these time frames. Under these circumstances, it seems reasonable to conclude that the achievements observed in the experimental population were attributable to the effects of the intervention.

Orphen (1978).

Also focusing on absenteeism, this study was conducted with forty-six female workers engaged in routine manual work (stitching and sewing operators) in a Capetown, South African manufacturing company. The subjects were randomly assigned to either a treatment or a non-treatment group. An A-B-A-B reversal design was employed. The treatment group received a small bonus (50¢) for each week they attended work every day, while the non-treatment group received no extra money for attendance.

The baseline measures taken during the first four weeks showed the overall weekly absenteeism rate for the treatment group to be 3.94% and 3.76% for the non-treatment group.

During the first intervention period, the average weekly absenteeism rate for the treatment group dropped to 2.56% and the non-treatment group remained constant at 3.70%. During the second baseline period, when the contingent bonus payments were removed, the average weekly absenteeism rate of the treatment group rose to 3.74% and the non-treatment group remained consistent at 3.71%. When the contingent bonus was reintroduced, the average weekly absenteeism rate of the treatment group dropped to 2.01% and the non-treatment group remained at 3.68%.

This study provides clear evidence of the efficacy of a small monetary bonus as a reinforcer for improved attendance in an industrial work environment. However, further research is needed to establish whether this particular modification technique will reduce absenteeism among different employees under dissimilar work conditions. The durability of such an intervention needs further study as well. The cost effectiveness of this type of intervention is also a matter for careful preliminary investigation.

McCarthy (1978).

The setting for this study is a textile yarn mill. The subjects are doffers, employees responsible for taking full bobbins off the spinning machines and replacing them with

the empty ones. All subjects are males, 19-27 years of age, with one month to four years experience. The manager of the spinning department wanted to decrease the number of high bobbins found on the spinning frames.

By counting the number of high bobbins on each shift on a random schedule without announcing what he was doing, the department manager established an eight-day average of 55.9 high bobbins per day during baseline. A behavioral analysis of baseline conditions revealed that neither doffers nor their supervisors were cognizant of a meaningful performance goal regarding high bobbins.

During the intervention stages, a graph showing baseline performance was posted for each shift. In addition, a goal was established for gradually reducing the number of high bobbins to twenty (five per shift) within a 15-day period. This reduction was indicated by a descending line on the graph. A second descending goal was then added requiring a reduction of high bobbins to twelve over an additional two-week period. When the second goal was met, a third goal was established at zero.

The goals were discussed with each shift supervisor who, in turn, announced the goals to their doffers. The shift supervisors were instructed to reinforce their doffers verbally whenever an improvement was made. The department manager gave verbal feedback and reinforcement to both supervisors and doffers as he made his counts.

Interestingly enough, the first two goals of the intervention stage (20 and 12 respectively) were met at very nearly the rates of improvement suggested by the descending lines on the wall chart. The third goal of zero was approached but never attained. McCarthy points out that "the phenomenon of the rate of change paralleling the slope of the goal line seems to indicate that the goal itself functions as a controlling factor in behavior change". During the reversal stage (eleven days), the number of high bobbins increased from a low of three to a high of fifteen before the department manager decided that he could not afford to let performance return to baseline conditions. Performance improved, once again, over the next twelve working days with the reintroduction of the feedback-praise contingency demonstrated very clearly the efficacy of the consequence.

Runnion, Johnson & McWhorter (1978).

In a less controlled, but highly successful, feedback-praise performance improvement program, Runnion, et.al., significantly impacted on the truck turn-around time of ninety-two drivers from a major textile company. Fifty-eight plant locations over a three state area served by the transportation department were included in the study.

The average truck turn-around time was selected as the behavioral indicator. This encompassed the cooperative behaviors required from the driver, warehouse employees, and other plant personnel. A baseline average of 67 minutes was calculated without the knowledge of the drivers. A goal of 45 minutes was established as reasonable at a top management meeting. For the next 19 weeks, a weekly letter was sent to each plant manager that met this goal. Plant managers at locations not meeting this goal received the same letter, but also received information regarding the average truck turn-around time for his location. The letter also included notes on improved times and a "thank you" for the efforts being made.

A feedback letter of the same format was sent to plant managers every two weeks for 80 weeks during the second phase of this study.

Finally, the identically formatted feedback letter was continued on a variable interval schedule averaging once every four weeks. This practice continues to the present.

During all conditions, prompting letters were sent to drivers which explained the project and enumerated ways to reduce truck turn-around time. Group reinforcers for meeting the goal during all conditions included a certificate to plants at or below the goal for nine, then 16 consecutive weeks.

Additionally, photographs were awarded to forklift operators and dock workers which pictured themselves with the plant manager, and plaques were given to warehouse foremen and crews. Individual reinforcers for drivers included reinforcing memos from the plant manager which were posted on the plant bulletin board, feedback letters and reinforcing memos from the director of transportation and company president, as well as verbal praise. These reinforcers were presented on a variable interval schedule.

The results showed that after a baseline average of 67 minutes was determined for all plants, turn-around time was reduced to an average of 39.1 minutes during Condition A (weekly feedback letters), to 37.2 during Condition B (two-week feedback), and to 38.3 minutes during Condition C (variable four-week feedback). This represents a 25% reduction from baseline, and suggests that informational feedback on the outcome produced by the behaviors of many people can be used to improve and maintain improvement of those behaviors. Most importantly, this study demonstrates the maintenance of improved performance over a long period of time (3-1/2 years) utilizing a fading schedule of feedback.

One final study, not included in the Andrasik (1979) review, will be provided to further illustrate the potential of behavior modification in the business work setting.

Kim & Hamner (1976).

Using a non-equivalent, quasi-experimental design (Campbell & Stanley, 1969), Kim & Hamner (1976) investigated the effect of goal setting and feedback on service type performance in a large telephone company. Three experimental groups received either extrinsic feedback, or extrinsic and intrinsic feedback in addition to goal-setting, while a fourth group received only goal-setting instructions.

Baseline performance levels were established for each group for each of four dependent variables, i.e. cost performance, safety, and service. These three performance measures were used by the company for determining the relative efficiency of each plant on a monthly basis. Each measure was specifically defined.

Approximately 220 unionized workers from four plants were involved in the study, there were six work groups in three of the plants and seven more in the fourth plant. The work groups ranged from three to eight employees. A behavioral analysis of baseline conditions revealed that minimal goal setting and feedback, if any, was being utilized by supervisors before the 90-day intervention.

Experimental Group 1 in Plant 1 received extrinsic feedback only. Each Monday, the foreman announced how many workers

in each work group had met the previously determined weekly goals. The goals for the current week were also announced at this time. Further on in the week, the foreman would visit each employee and praise him/her for exceeding the prior week's performance and/or exceeding the company's goals in each category, as appropriate. These sessions were informal and at the job site. The foremen were not allowed to give negative feedback during these sessions.

Experiment Group 2 in Plant 2 received intrinsic (self-generated) feedback only. Each Monday, the foreman would meet with the employees to set goals for the current week. Fridays of each week, the workers would rate themselves on a set of forms. At the end of the 90-day intervention period, the employees turned in their anonymous forms.

Experiment Group 3 in Plant 3 followed the same procedures as Group 2 (above). However, the foremen collected the data on Friday of each week and used it for the Group's feedback and goal-setting meeting on Monday. Also, during the week he would praise each worker as was done in Group 1.

Experimental Group 4 in Plant 4 received goal-setting instructions only. Goals were reinforced each Monday, but no feedback was provided on a formal basis.

The results indicate that a combination of goal-setting

and feedback is superior to goal-setting alone on the cost and safety measures of performance. On the more subjective service rating, the greatest amount of improvement occurred in the external feedback plus praise groups; again, indicating that goal-setting plus external feedback and praise is superior to goal-setting alone in bringing about improvements in performance. The generalization of the results of the study are limited, however, since the subjects were not randomly assigned to the experimental groups.

Trends in the Literature and Recommendations for Future Research.

The practice of managing contingencies of reinforcement in order to modify behavior is not new. Skinner (1953) clearly demonstrated the efficacy of this technique for shaping the performance of lower level animals. Bandura (1969) also demonstrated the appropriateness of this approach for behavior therapy. Kazdin (1975) and Presbie and Brown (1976) have brought together considerable evidence in support of behavior modification for managing a wide range of classroom behavior. What is new is the use of behavior modification techniques in the world of work, particularly in business and industry.

As this review of the literature indicates, the evidence

in support of the efficacy of behavior modification techniques in the world of work is not conclusive, but it is mounting. Unfortunately, the more significant applications of this technique are only supported by case studies, which provide little more than before and after assessment statistics. However, more and more controlled research is now being conducted which utilizes the techniques employed in these case studies. Goal-setting, feedback and praise are emerging as important contingencies in the work environment.

Several conclusions can be drawn from this review. First, behavior modification is currently being used rather extensively in many large companies. Second, virtually all of the case studies and controlled research have reported significant improvements in the targeted performance. Third, the five-step implementation procedure proposed by Luthans & Kreitner (1975) and later by Miller (1978) appears to accurately describe the procedures employed by those practitioners and researchers who have reported the most significant improvements in performance. Finally, the empirical evidence which does exist is limited in that it focuses, for the most part, on highly controlled work environments -- not unlike the treatment and educational environments where behavior modification has been used effectively in the past. Very little

evidence is available (Kim and Hamner, 1976) to support the notion that behavior modification can be predictably utilized in more complex working environments, where the breadth and depth of experience of the employee (i.e. reinforcement histories) along with conflicting reinforcement contingencies (i.e. supervisor, peers, union, family, et.al.) may very well serve to severely restrict the usefulness of this change technology.

It is clear that additional research is warranted in broader, more complex working environments where the efficacy of behavior modification has been proclaimed but not sufficiently tested. It would also seem appropriate to further examine the potential of the "natural reinforcers", i.e. performance feedback and praise, not only because these consequences have been used so effectively for treatment and classroom management, but also because of their cost effectiveness. The implications for management of such research are quite obvious. The humanistic implications of such a discovery are equally worthy of acknowledgement.

C H A P T E R I I I

Methodology

This study builds upon the research on behavior modification described in the previous chapter; focusing very specifically on the use of performance feedback and contingently administered supervisory praise in a relatively complex work setting. Three substantive questions are addressed:

(1) to what extent, if any, will daily performance feedback and contingent praise from a supervisor impact on the performance of a group of unskilled employees in a complex industrial work environment? (2) to what extent, if any, will this treatment impact differently on the performance of selected demographic segments of the work group? e.g. subjects with different job classifications, time with company, positions in the salary range, dates of birth, etc., and (3) to what extent, if any, will the impact of this treatment on individual employees be consistent with its impact on the overall work group?

Setting

The subject company is a well established \$100 million ring-binder manufacturer located in western New England. For

more than one hundred years, it has been recognized as an industrial leader in the production of high quality office products. Its primary manufacturing complex, where this study took place, was built before the turn of the century in one of the largest industrial cities in that region. It is not unusual to find employees with more than twenty-five years of experience with the company. Until about ten years ago, the company was fully owned and closely managed by the same family that produced its first ring-binder many generations ago. Today, it is a wholly owned subsidiary of a Fortune 500 corporation.

The subjects were all employees of the metals assembly department of the company's metals division. Most worked at large work tables where they would assemble the various ring metal parts by hand. Some of the employees worked alone on punch presses, inserting rivets into the previously assembled metals. A few others would line-up and adjust the metals, as appropriate, once they have been riveted. While the employees were permitted to talk with one another while working, it was difficult for them to do so because of the noise produced by huge, nearby presses which simultaneously cut and shaped the ring metals.

The assembly department was dependent upon two other

departments for parts. The above stated department, which produced the parts from raw metal and the plating department, which electro-plated the raw materials with nickel. The availability of needed parts and the quality of these parts, in general, was a constant problem for the assembly department before, during, and after the study.

The metals assembly department was recommended by the company, and selected by the researcher, for the following reasons:

1. There were no machine-controlled operations in the department. Employee productivity was therefore a function of the employee, her supervisor, the availability of parts, and other aspects of the work environment (which will be described in detail later in this chapter).

2. The time standards for each job were considered to be acceptable by all parties involved, i.e. the manager of time standards, the supervisor, production control, accounting, and the union leadership. If the standards were considered to be too "tight" or too "loose", it was never revealed to the researcher. However, many other departments, otherwise ideal for research, were rejected by the researcher because their time standards were found to be unacceptable by one or more parties.

3. The department was typical of many departments within the company and its parent corporation. Skill requirements were minimal. The supervisor had been with the company for many years. The work was highly organized and routine. The facilities were old and designed to be more functional than aesthetically appealing. The work itself represented only one small part of the overall product, of which the employee would probably never see.

4. The overall performance of the department (first, second and third shifts) was approximately 5% below budget (YTD) on production vs expectation during the baseline period, thereby indicating room for improvement.

5. Since the supervisor was responsible for more than sixty employees on the first shift, but had never been provided with daily information about their individual performance, the department provided an excellent opportunity for a feedback-praise intervention. This opportunity is further described later in this chapter, but in essence, it was based upon the fact that the supervisor could not possibly give employees specific performance feedback and contingent praise on a daily basis without having specific knowledge of their daily performance.

Subjects

The performance of thirty-four first shift employees and their supervisor was closely examined during the course of this study. All subjects were union members; classified by the company as assemblers, punch press operators and line-up and adjust operators. A detailed breakdown of this work group is provided below. All subjects were women. The supervisor was a white male.

TABLE 3

Demographic Breakdown of the Subject Work Group

Job Class	No.	Years of Service	Position in Salary Range	Age Range	Mean
Assemblers	25	8.3	110.1%	18-64	42.2
Punch Press Operators	5	10.1	109.2%	28-56	45.4
Line-up and Adjust Operators	4	23.0	132.8%	49-62	52.3

Dependent Variables

The results of performance, as indicated by a percent of expectation, represented the dependent variable in this study. Performance requirements were previously established by the

time standards department for each operation based upon the measured day-work system described below.

Each labor grade hourly payment range includes a base rate representing standard physical effort, which is described as normal performance of 100%: the work pace of an experienced operator moving neither fast nor slowly, but rhythmically, consistently, continuously and without hesitation, and maintainable throughout the work day under a predetermined set of conditions without incurring more than normal fatigue. The normal efforts are added allowances for fatigue, unavoidable delays and personal needs. All standards determinations are made in the time standards department.

The top of each range is 25% greater than the base rate and represents physical effort of 25% in excess of standard time in consideration of receiving merit increases to that level of payment, with the exception of machine controlled operations, for which operators may be evaluated on quality of work, versatility, cooperation and attendance as well as on productivity.

A weekly performance report is made for all employees based upon standards as measured and is reflected as a percentage earned relative to the individual's personal quota (required % expected over the base rate).

The net change in performance across experimental stages was ultimately used as an indicator of the degree to which the independent variables, i.e. feedback-praise, impacted on the performance of the overall work group, selected demographic

segments and/or individual employees.

Independent Variables

Daily performance feedback and contingent supervisory praise represented the independent variables. Feedback was operationally defined as information about past behavior presented to the person who performed that behavior (Miller, 1978). Praise was defined as verbal acknowledgement by the supervisor of the fact that the employee's daily performance had improved over the previously recorded work day, e.g., "good work", etc. The supervisory praise was always paired with feedback indicating performance improvement.

The daily feedback was strictly controlled by the supervisor throughout the study. Specific daily feedback could not have been presented to employees on a daily basis by the supervisor before the study and during the controlled reversal period, since this information was not available to him. The data was processed by central management information systems (M.I.S.) and sent to the researcher on a daily basis. The availability of this information was controlled by the researcher before, during and after this study.

The supervisory praise, however, was not as closely controlled. While the supervisor could not give specific,

contingent verbal acknowledgement of performance improvement on a daily basis without the performance data, he could have provided praise on an intermittent schedule, based upon observed performance improvement at any time. Similarly, the supervisor was instructed to provide praise contingent upon performance improvement (cued by an arrow on the daily feedback sheet), but since he was not directly observed during the feedback-praise interventions, there is no way of knowing for certain the degree to which the praise was appropriately presented (see Chapter V, Limitations).

Instrumentation and Forms

The raw performance data was transferred from the computer printouts to the feedback sheets each morning (see Appendix A) by the division accountant. The supervisor would then show this form to the employee as he presented the daily feedback and praise (as appropriate).

While the supervisor was making his daily feedback-praise interventions, the division accountant worked at his desk and recorded the start and stop times. The elapsed time for the intervention was then calculated on a daily basis. The completed form used for this purpose is provided in Appendix B.

Design

Since it is extremely difficult to implement traditional control group experimental designs in an industrial work setting, a single-case experimental design was employed. More specifically, An A-BC-A-BC reversal design was selected (Hersen & Barlow, 1976; Eisler, Hersen & Agras, 1973). While it is not possible to draw conclusions as to the relative contributions of each individual treatment component using this design, i.e. feedback vs. praise, it is possible to analyze the combined effect of the feedback-praise intervention on performance under these conditions (Kazdin, 1978). All conclusions in this study are based upon the presumed adequacy of the experimental design plus a visual inspection of the net changes in performance across the experimental stages described in Figure 1.

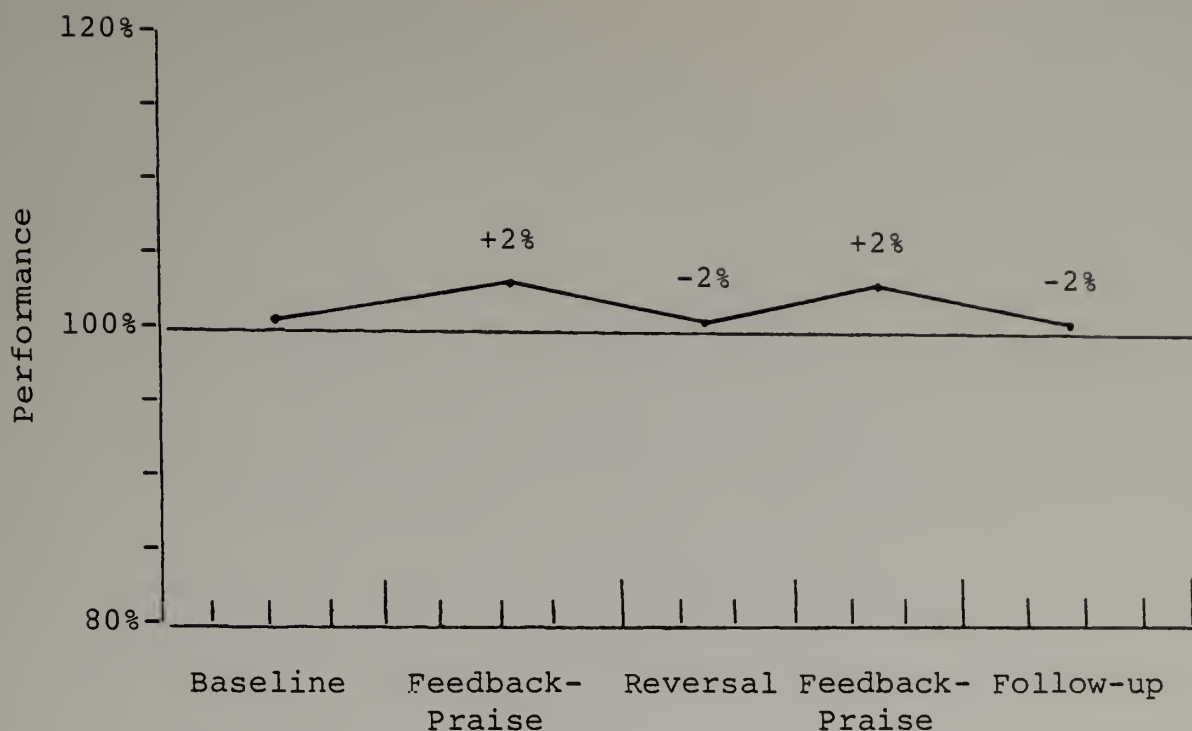


Figure 1. Evidence of a "Saw-Tooth" Pattern With a Net Change in Performance Across Stages $\geq 2\%$.

Net changes in performance \geq across stages will be considered to be significant evidence of the efficacy of the feedback-praise intervention. Under normal circumstances, employees are provided with merit increases from the company for performance improvements $\geq 2\%$ which are maintained for extended periods of time.

Procedural Steps

The five-step implementation procedure for behavioral interventions proposed by Luthans & Kreitner (1975), supported

by Miller (1978), and used extensively in earlier studies (Hamner & Hamner, 1976) was closely followed throughout the course of this study. The specific details of each step are described below.

Step 1 - Identification of performance related behavior.

As indicated earlier, performance requirements for each employee had been previously established by the time standards department based upon a normally established measured day-work system. The standards established for each operation in the subject department had been accepted by all parties involved, i.e. representatives of both the union and management.

In summary, each subject was expected to attain 100% of his or her assigned quota. During the course of the study, performance change of any kind was reflected in the subject's daily performance data as a percentage of this quote. Daily performance, i.e. the number of parts produced, was self-monitored (normal company routine) throughout the study as recommended by Hamner and Hamner (1976) and Feeney (1971). The data was then tabulated by the assigned timekeeper, verified by cost accounting, and machine processed within twenty-four hours of receipt by management information systems (M.I.S.). It is important to note that prior to this study, the daily performance data was maintained by central account-

ing and never released to the department. The department received weekly summary reports only.

Step 2 - Establish a baseline of performance.

Prior to the initial feedback-praise intervention, a baseline of existing performance (%of the quota) was established for each employee individually and for the department overall. The baseline extended for four work weeks (twenty working days) from May 21, 1979 to June 18, 1979. Neither the supervisor, nor the subject employees, were apprised of the study until just prior to the first intervention. The supervisor was asked on Friday, June 15, 1979 by his division manager, general foreman, and the researcher to participate in the study. However, it was not until the following Monday, just one day before the start of the first intervention, that he was informed of the details of the study by the researcher. This briefing took place as an integral part of the training session described in detail in Step 4. The subject employees learned about this "personnel project" from their supervisor on the following day as he made his first rounds with the feedback sheets. Neither the employees nor their supervisor were apprised of the experimental design employed during this study.

Step 3 - Identify the behavioral contingencies.

Performance-related behavior in the subject department was considered to be a function of (1) the antecedent stimuli which set the occasion for the performance, and (2) the contingent consequences which strengthened or weakened the performance, depending upon the type of consequence, its schedule, duration, etc. Through a series of interviews and observations, the following contingencies were found to exist in the department during the baseline period (see Summary, TABLE 4.

TABLE 4

Summary of Existing Behavioral Contingencies for the
Subject Employees under Baseline Conditions

Antecedent Stimuli	Performance Expectations	Extrinsic Consequences
Supervisor or group leader makes daily assignments providing minimal guidance.	"punch in"	Employee is left alone if work appears to be satisfactory to supervisor (0).
Route sheets provide base rate for job; quota must be determined by employee based upon position in range.	Work on assignments maintaining a personal record of all performance on time card.	Employee gets attention from supervisor if work appears to be unsatisfactory (-/+).
Peers provide guidance.		Employee gets new assignment from group leader or supervisor when assignment is completed (-/+).
Supervisor and group leader circulate.	"punch out"	

Antecedent stimuli.

The supervisor was responsible for the direct supervision of sixty or more assemblers on any given day. He and his group leader would make daily assignments, beginning at 7:00 a.m. each morning, based upon the production quota for that day which was provided by production control. Employees were generally expected to begin work immediately; determining their production quota for themselves, using the base-rate listed on the route sheet and their present position in their range in the calculations. The consensus of opinion among all exempt and non-exempt employees interviewed on this subject was that few employees had difficulty with this calculation and, more importantly, that when someone did have a problem, one of their peers would be quick to help them with it. Along these same lines, peers could be relied upon for guidance and demonstrations, i.e. modeling, on unfamiliar routines as well. The supervisor and group leader could only be relied upon for assistance under extraordinary circumstances, e.g., with first or second day employees, equipment malfunctions, materials problems, etc.

Performance expectations.

Employees were expected to "punch in" each day and report to their work stations by 7:00 a.m. Once they received their

assignment(s), they were expected to perform in accordance with the established standards for the assignment and their position in their salary range. For example, if they were being paid at 110% of their salary range, they were expected to produce at 110% of the base-rate for the given routine. If they stopped for breaks, lunch or a new assignment, they were expected to keep a detailed accounting of each activity and record it on their time card. At the end of the work day, they would submit their performance record to the timekeeper as they "punched out". A comparison between the employee's daily performance (as submitted) and the amount of raw materials supplied to the employee was then made to verify the time card. Once verified by accounting, the card was forwarded to M.I.S. for machine processing within the next twenty-four hours.

This record of employee daily performance was maintained by central accounting and never passed on to the department. A weekly average was calculated and presented to the department. The weekly average was provided to the supervisor on Wednesday afternoon or Thursday morning of the following week as a part of the normal M.I.S. routine. This routine was maintained before, during and after the study.

Extrinsic consequences.

The supervisor's time was severely limited by the large number of employees reporting directly to him and the constant materials and equipment problems he had to resolve. As a result, he had developed a highly reactionary management style, what is often referred to as a "fire-fighting" pattern of behavior. In essence, he had learned how to manage by exception, spotting potential problem areas very quickly, but often failing to see or even punishing desirable performance in the process.

This pattern of behavior generally resulted in good workers being left alone (0), or being inadvertently punished (-) with new assignments which may or may not have been reinforcing. As a general rule, the only employees who could fully expect to receive a good deal of attention from the supervisor were those whose performance, for whatever reason, was obviously less than the established standard. The attention they received was not always reinforcing, depending upon the circumstances.

In summary, during baseline conditions, good performance generated little extrinsic feedback or praise from the supervisor on a daily basis. This is not to say that he did not provide some degree of feedback-praise to selected employees for good performance on some other schedule of reinforcement.

What it says is that, under baseline conditions, the supervisor did not have the information required to deliberately and consistently utilize performance feedback and contingent praise on a daily basis to reinforce performance improvement within the department.

Step 4 - Develop an intervention strategy.

The literature on behavior modification in business and industry (Chapter II) suggests that daily performance feedback and contingently administered supervisory praise can be effectively used to reinforce, i.e. strengthen and maintain performance improvement in a variety of work settings. Since evidence of this contingency was not found during baseline conditions in the metals assembly department, it was decided that such a contingency would be introduced as a means of reinforcing improved performance in this relatively complex work environment.

During this stage of the study, the supervisor gave specific performance feedback to each employee on a daily basis between 7:00 and 8:00 a.m. At this time, he would also provide praise to the employee contingent upon (1) any degree of performance improvement over the previously recorded work day and/or (2) quota accomplishment. This intervention stage (BC) began on June 19, 1979 and extended for eighteen working

days until July 13, 1979.

To help the supervisor with this intervention, it was necessary to prepare a feedback sheet (Appendix A) for each employee prior to 7:00 a.m. each day. This was done throughout the first intervention by the division accountant. The feedback sheet provided the employee's name and number; performance data for the last processed work day (Note: there was a 24-hour delay in the data, i.e., Monday's data was not available until Wednesday morning for feedback, etc.); and a visual cue (↑), as appropriate, which provided a signal to the supervisor that praise as well as feedback was to be given to the employee on that particular day.

A daily record of the starting and stopping times for the performance feedback-praise intervention (Appendix B) was maintained by the accountant. He would remain at the supervisor's desk, out of sight from the subject employees, until the supervisor returned from his feedback-praise rounds. His arrival at the supervisor's desk each morning served to set the occasion for the intervention. A smile and a thank you before leaving helped to reinforce the supervisor for following the study guidelines very closely. The accountant played a vital role in the study. This point is further clarified by the following summary of the contingencies of reinforce-

ment which were established for the supervisor as a means of developing, strengthening and maintaining his feedback-praise performance.

TABLE 5

A Summary of the Contingencies of Reinforcement

Established for the Supervisor and

Maintained During the Study

Antecedent Stimuli	Expected Performance	Consequences
Division manager and general foreman ask the supervisor to participate in the study.	Supervisor provides performance feedback to all employees on a daily basis and praise to all who improve their performance and/or reach their quota.	A thank you and a smile from the accountant at the end of the daily rounds (+).
Training is conducted by the researcher on the last day of the baseline period.		Employee reactions to the data and the contingent praise (+/-/0).
Division accountant arrives each morning at 6:45 a.m. with the data		Attention from the researcher each Friday (+/0).
The ring-binder filled with data is handed directly to the supervisor.		Attention from the general foreman at the end of each week (+).
The cue () signals the supervisor to provide praise as well as feedback.		Intermittent attention from the division manager (+).
		Performance improvement in the department (+).

Training.

A seventy-minute training session was conducted on June 18, 1979 in order to: (1) inform personnel of the goals and objectives of the study, (2) describe roles and responsibilities, (3) develop the feedback-praise technique, and (4) instruct the division accountant on how to develop the feedback sheets. The supervisor and the division accountant were the primary participants with the general foreman and company training and development specialist on hand to serve as back-up for each of them respectively. In addition, the managers of time standards, cost accounting and personnel were invited to attend, since they had been fully apprised of the nature and scope of the study and had been most helpful in putting together the original proposal. Their interest in the study and understanding of all key elements proved to be most helpful to the researcher.

The agenda for the training included:

Introduction	5 minutes
Lecturette: Using performance feedback and praise to improve performance (A/V tape)	20 minutes
Discussion	10 minutes
Drill	5 minutes

Agenda for training, cont'd:

Data Preparation	20 minutes
Discussion	10 minutes
	<hr/>
TOTAL	70 minutes

The training began with an introduction by the researcher of the purpose of the study, i.e., to examine the effects of performance feedback and contingently administered praise on performance in the metals assembly department. Everyone was thanked for coming and encouraged to ask questions at any time.

The audio-visual tape, describing (1) the goals and objectives of the study from a personnel perspective, (2) the rationale behind the feedback-praise intervention, and (3) the time and manpower requirements were then presented. A verbatim translation of this tape is provided in Appendix C. The tape concludes with the researcher modeling the desired supervisory feedback-praise intervention using the actual feedback sheets in the process.

A ten minute discussion followed which allowed everyone involved to clarify their roles and responsibilities with regard to the project. A handout containing the following information was then distributed to each participant to ensure that everyone was in complete agreement.

Guidelines for Division Accountant

1. Complete feedback sheets by 6:45 a.m. and bring to supervisor.
2. Maintain accurate records (minutes and seconds) regarding the amount of time it takes for the supervisor to complete his feedback rounds each day. You should record the actual start/stop times on the appropriate form in front of the data in the ring-binder.
3. Inform the supervisor of the elapsed time he took to make the daily rounds.
4. Thank the supervisor for his efforts on a daily basis.
5. Return your feedback sheets to the Manager of Human Resource Development by 8:00 a.m. daily.
6. Minimize your discussion of performance changes during your daily visits.
7. Report all variances from these guidelines to the Manager of Human Resource Development ASAP.

Guidelines for Supervisor

1. Provide feedback between 7:00 and 8:00 a.m. to each employee each day.
2. Verbally acknowledge performance improvement of any degree; indicated on the feedback sheet by an arrow (↑).
3. Circle the day(s) of the week for which the feedback has been given as a record of the performance feedback.
4. Never explain the feedback during your morning rounds for more than a few seconds. Excuse yourself until after you have completed your rounds. Then, be sure to get back to the employees ASAP.
5. Feel free to discuss the performance feedback program with your employees at any time during the work day. Explain that many people have requested information about their performance. This program has been implemented to

5. meet this request. Hopefully, this knowledge of results will help employees to make or exceed their assigned quota. The program will last the entire summer (three months). The results will then be reviewed and a decision will be made as to whether or not the time required to provide the feedback can be justified.
6. Plan on a brief meeting with the Manager of Human Resource Development each Friday afternoon in the department to discuss the project.
7. Do not hesitate to call the Manager of Human Resource Development at any time with any problems or questions.

A performance feedback drill was then conducted in order to allow the supervisor and his back-up, the general foreman, the opportunity to demonstrate their ability to conduct the feedback-praise intervention in accordance with the above-stated guidelines. Both men demonstrated their understanding of their roles in this regard.

The data for the following day's intervention was then prepared by the division accountant for the first time. The supervisor observed this process, expressing a better understanding of the data having done so. The supervisor was then asked to demonstrate the proper presentation of the data with an employee, this time using actual data. Once again, his performance was precisely in keeping with the study guidelines.

A final ten minute discussion permitted all attendees to clarify their understanding of the study. All participants expressed very positive expectations regarding the impact of

the intervention on the subject department's performance. It is important to note that each of the primary participants left the training expecting the "project" to last the entire summer.

Follow-up.

The researcher met each Friday during all phases of the study with the supervisor for 5-10 minutes in his department to discuss the mechanics of the program and the supervisor's perception of the relative impact of the program on the department's performance. The performance data for selected individuals was used on four occasions by the supervisor as evidence of the value of the effort. The researcher deliberately limited his comments to his observation of the supervisor's continuing compliance with the guidelines of the study; providing praise to the supervisor for being so supportive. The conversations never lasted more than ten minutes.

On a number of occasions he offered very specific examples of how it could be used in other departments as a performance improvement technique. It was obvious to the researcher and the general foreman that the supervisor was keenly aware of what he was doing and enthusiastic about the perceived potential of performance feedback and praise to him as a performance improvement technique.

After each weekly meeting with the supervisor, the researcher would meet with the general foreman and discuss the subject department for 5-10 minutes; focusing on extraneous variables such as parts shortages, quality, the temperature in the department, the supervisor, etc. The general foreman would subsequently talk with the supervisor for a few minutes and compliment him for his support of the study. The general foreman believed that the study would ultimately prove to be very supportive of a division-wide quality project he was working on. For this and other reasons he, too, was very supportive of the study in its entirety.

A great deal of attention was paid to the contingencies of reinforcement established to strengthen and maintain the supervisor's cooperation throughout the study. Based upon observations of his performance by the general foreman, the division accountant, the training and development specialist, and the researcher, it is reasonable to assume that the supervisor did, indeed, find these contingencies to be reinforcing.

Step 5 - Evaluate for performance improvement.

The use of daily feedback and contingent supervisory praise was controlled by the researcher throughout all stages of the study. During the baseline period (A), the data upon

which such specific interventions could be made was not available. During the first and second interventions (BC), it was only made available between 7:00 and 8:00 a.m. During the reversal stage, it was unavailable because of "priorities in the M.I.S. group". Finally, it was withheld at the end of the study so that the data could be fully analyzed and the value of the project could be discussed.

Operational Hypothesis

The impact of these independent variables on the performance of the subject work group was carefully examined in light of the literature described in Chapter II and the details of the subject environment. To facilitate this analysis, the three substantive questions addressed by this study were formulated into operationally stated hypothesis as follows:

Hypothesis A: The first feedback-praise intervention will result in an overall improvement in work group performance $\geq 2\%$. Subsequent withdrawal of the intervention will result in a performance reduction $\geq 2\%$. Re-introduction of the feedback-praise intervention will also generate an overall improvement $\geq 2\%$.

Hypothesis B: Demographic variables such as job classification, time with company, position in salary range and age will not be significant factors under these experimental conditions.

Therefore, the performance of each of these segments will be consistent with the overall work group.

Hypothesis C: The performance of individual subjects will be consistent with the performance of the overall work group.

Accordingly, the group changes in performances will be reflected equally in the performance of a majority of the subjects.

The results of this study are presented in the next chapter in light of these hypothesis. An analysis of the degree of which the data provide evidence in support of a functional relationship between the feedback-praise intervention and the subsequent changes in performance follows.

C H A P T E R I V

Results

The results of this study address three substantive questions with regard to the use of behavior modification techniques in the industrial work setting. First, to what extent, if any, will daily feedback and contingent praise from a supervisor impact on the performance of a group of unskilled employees? Second, to what extent, if any, will this treatment impact differently on the performance of selected demographic segments of the work group? e.g. subjects with different job classifications, time with company, positions in the salary range, dates of birth, etc. Finally, to what extent will the impact of this treatment on individual employees be consistent with its impact on the overall work group.

Each of these questions has been formulated into a separate and distinct hypothesis, incorporating current trends in the management literature with detail of the subject work environment. The results are presented in this chapter in light of these hypothesis.

Hypothesis A

The first feedback-praise intervention will generate an overall group performance improvement $\geq 2\%$ (note: maintenance of performance improvement $\geq 2\%$ for an extended period of time is formally acknowledged by the subject company with a comparable merit increase above and beyond the negotiated increase). Subsequent withdrawal of the intervention will result in a performance reduction $\geq 2\%$. The second feedback-praise intervention (identical to the first) will also generate an overall performance improvement $\geq 2\%$.

The data is presented in tabular form. If the interventions have the predicted effect, the tabulation will reveal evidence of a "saw-tooth" pattern in the data. Net changes in performance across stages $\geq 2\%$ will be recognized as significant evidence in support of Hypothesis A (see Chapter III, Figure 1).

The overall performance of the subject work group, including 25 assemblers, 5 punch press operators, and 4 line up and adjust operators is represented in Figure 2. The 34 subjects improved their performance by 2.2% during the first intervention over the baseline performance; reduced their performance by 2.0% during the reversal; improved their performance by 0.8% during the second intervention; and finally,

reduced their performance by 3.6% during the follow-up period.

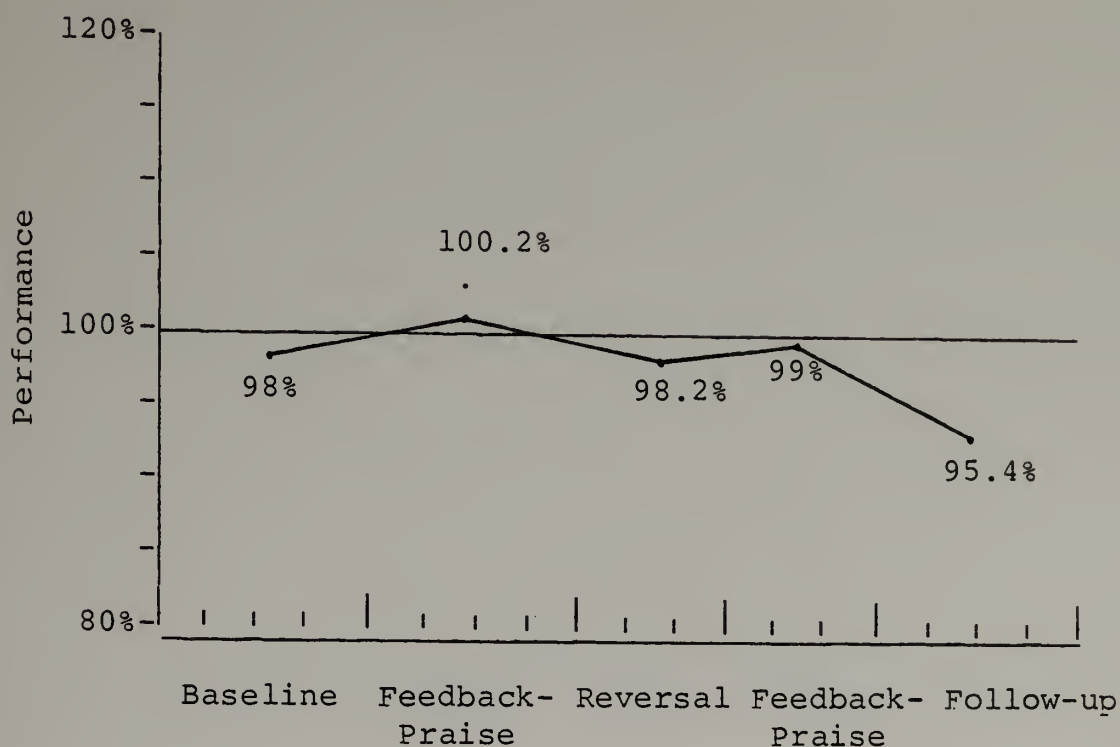


Figure 2. Changes in Overall Work Group Performance Across Each Experimental Stage.

While a "saw-tooth" pattern is evident in the data, it is not consistently significant ($\geq 2\%$) across all stages in the study. It appears that the first intervention was more reinforcing to the employees than was the second. The net changes in performance are supportive of Hypothesis A, but do not meet the criteria for significance established earlier.

Hypothesis B

Variables such as job classification, time with company,

position in salary range, and age will not be significant factors on performance under these experimental conditions. Therefore, the performance of each of these segments will be consistent with the performance of the overall work group as represented in Figure 2 (above).

Job classification.

Since the 25 assemblers made up 74% of the overall work group, it is not surprising that their performance was consistent with the overall work group's performance. The assemblers improved their performance by 2.6% during the first intervention; reduced their performance by 2.5% during the reversal; improved their performance by 0.4% during the second intervention; and finally, reduced their performance by 5.3% during the follow-up period.

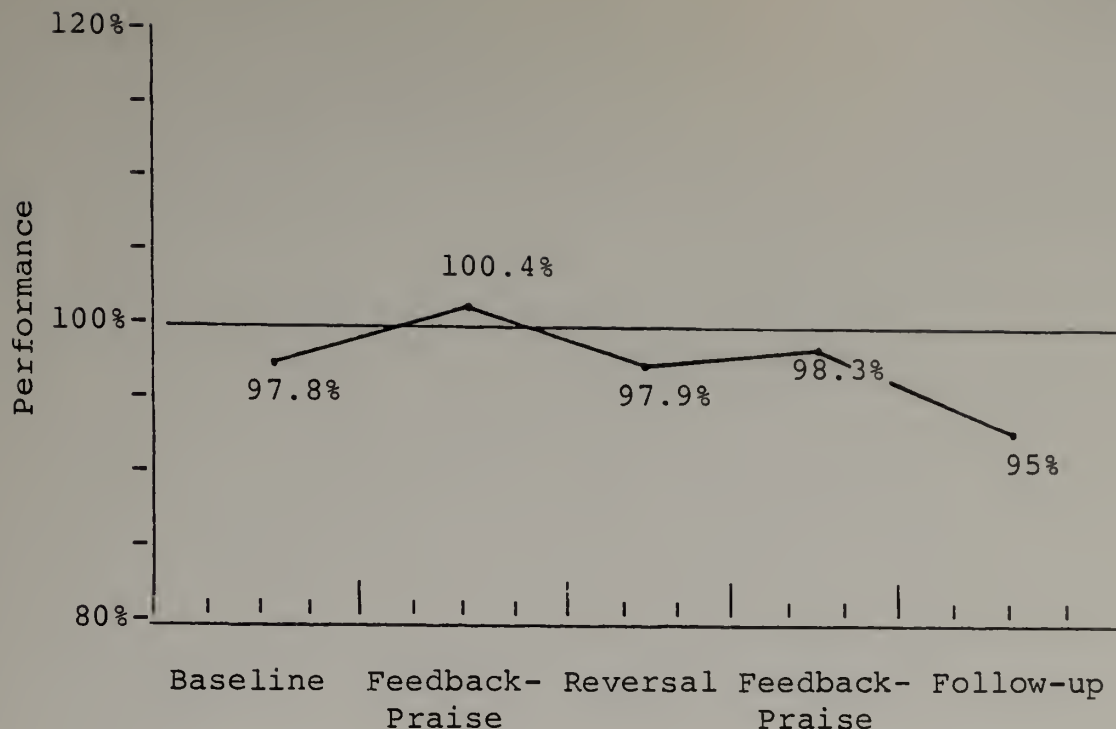


Figure 3. Changes in the Performance of Twenty-Five Assemblers.

While their performance is consistent with the overall work group data, and is therefore supportive of Hypothesis B, it is not consistently supportive of the efficacy of the feedback-praise intervention, since the net performance improvement of the sub-group during the second intervention was considerably less than 2%.

The five punch press operators improved their performance during the first intervention by 2.4%; reduced their performance during the reversal by 2.4%; improved their performance during the second intervention by 6.4%; and finally, reduced their performance by 6.3% during the follow-up period (see Figure 4).

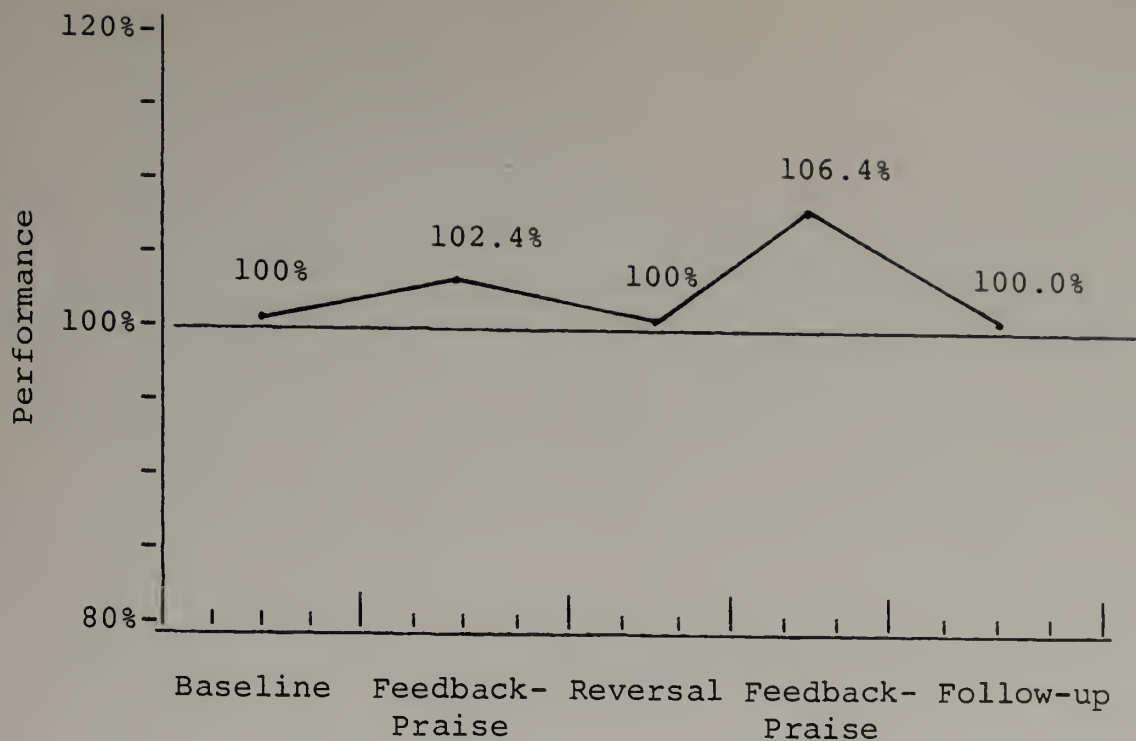


Figure 4. Changes in the Performance of Five Punch Press Operators.

These net changes in performance across stages provide significant evidence of the impact of the intervention on this sub-group. However, since the majority of the punch press operators found the second intervention to be considerably more reinforcing than the first (an obvious inconsistency with the overall work group data) the performance of this sub-group is not supportive of Hypothesis B.

The performance of the four line-up and adjust operators is even less supportive of Hypothesis B. Their performance decreased during the first intervention by 0.5%; improved

during the reversal by 1.6%; decreased, again, during the second intervention by 4.0%; and finally, decreased still further during the follow-up period by 0.5% (see Figure 5).

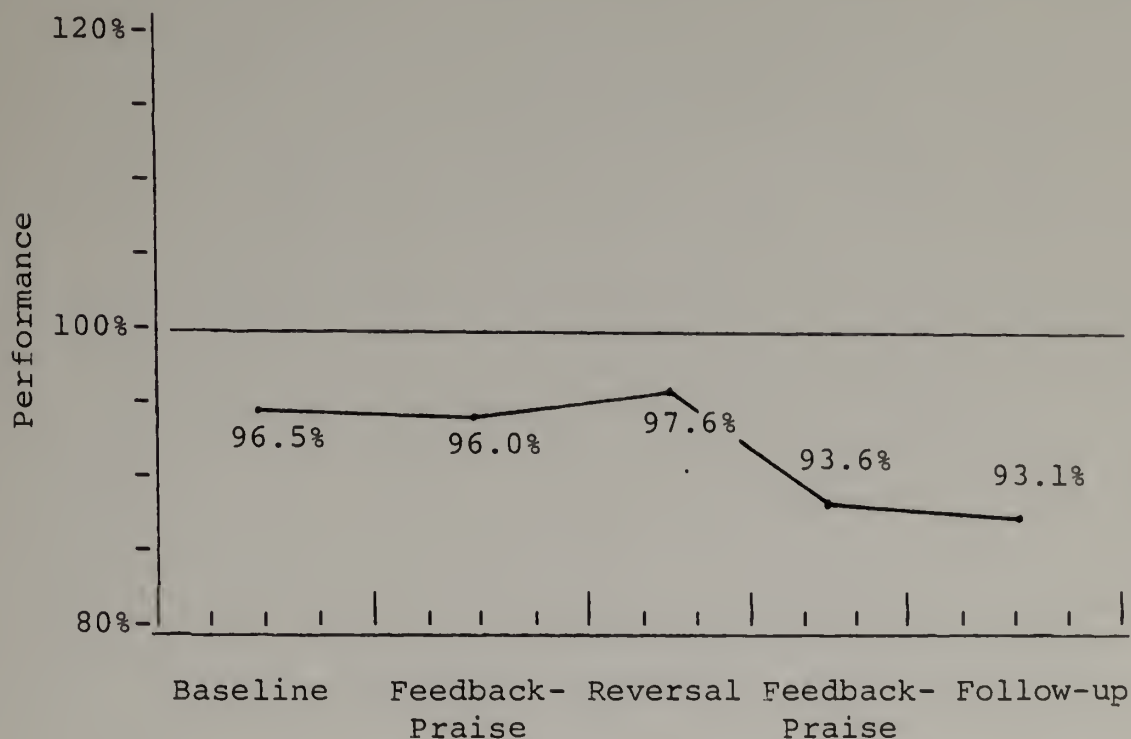


Figure 5. Changes in the Performance of Four Line-Up and Adjust Operators.

These net changes in performance are inconsistent with the performance of the overall work group and are therefore in contradiction of Hypothesis B. The distinct differences in performance between these three sub-groups suggests that job classification was, in fact, a significant factor in this study.

Time with company (assemblers only).

Ten of the twenty-five assemblers had less than one year with the company prior to the study. One punch press operator also fit this description, but was omitted from the sub-group because of her job classification. It should be noted that her performance was highly consistent with the performance of this sub-group.

These ten assemblers improved their performance by 5.8% during the first intervention; decreased their performance by 2.8% during the reversal; improved their performance by 4.8% during the second intervention; and finally, decreased their performance by 6.9% during the follow-up period.

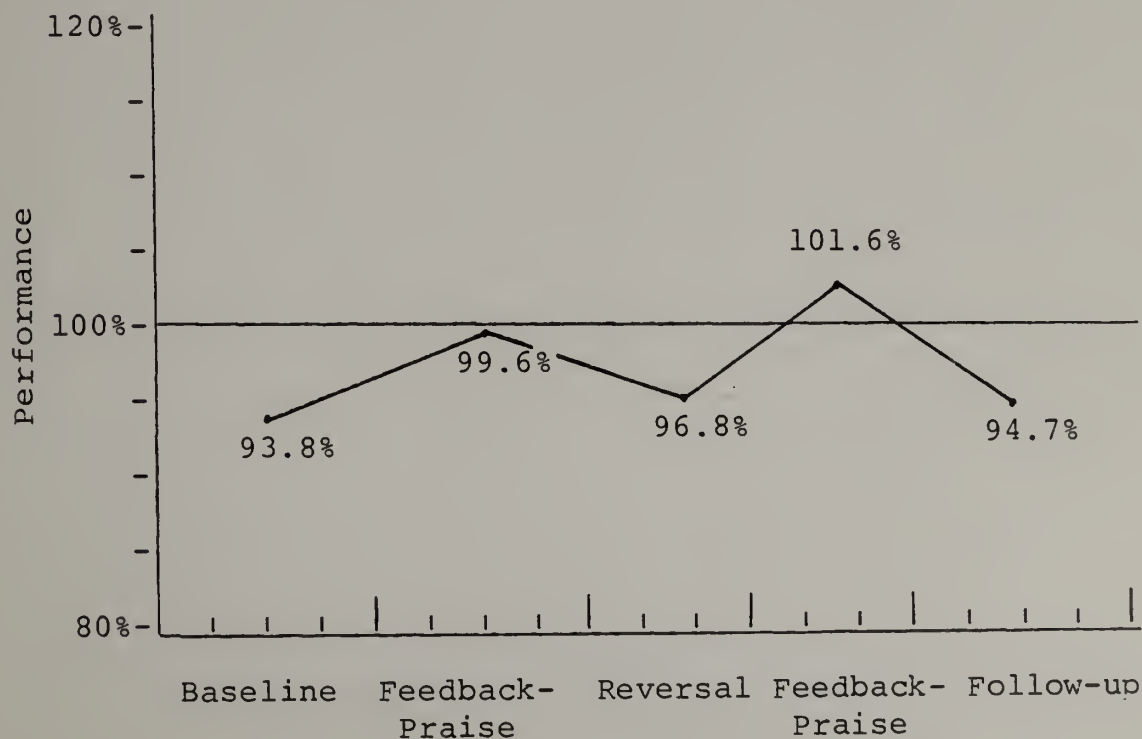


Figure 6. Changes in the Performance of Ten Assemblers with

Figure 6 (cont'd.). Less Than One Year with the Company.

These net changes in performance are considerably greater than those of the overall work group. This inconsistency does not support Hypothesis B. The relatively high degree of performance change is, however, supportive of the efficacy of the feedback-praise intervention for this sub-group.

In marked contrast, nine assemblers with ten or more years of time with the company decreased their performance during the first intervention by 2.4%; decreased their performance during the reversal by 2.6%; decreased their performance again by 0.8% during the second intervention; and decreased their performance by yet another 0.5% during the follow-up period (see Figure 7).

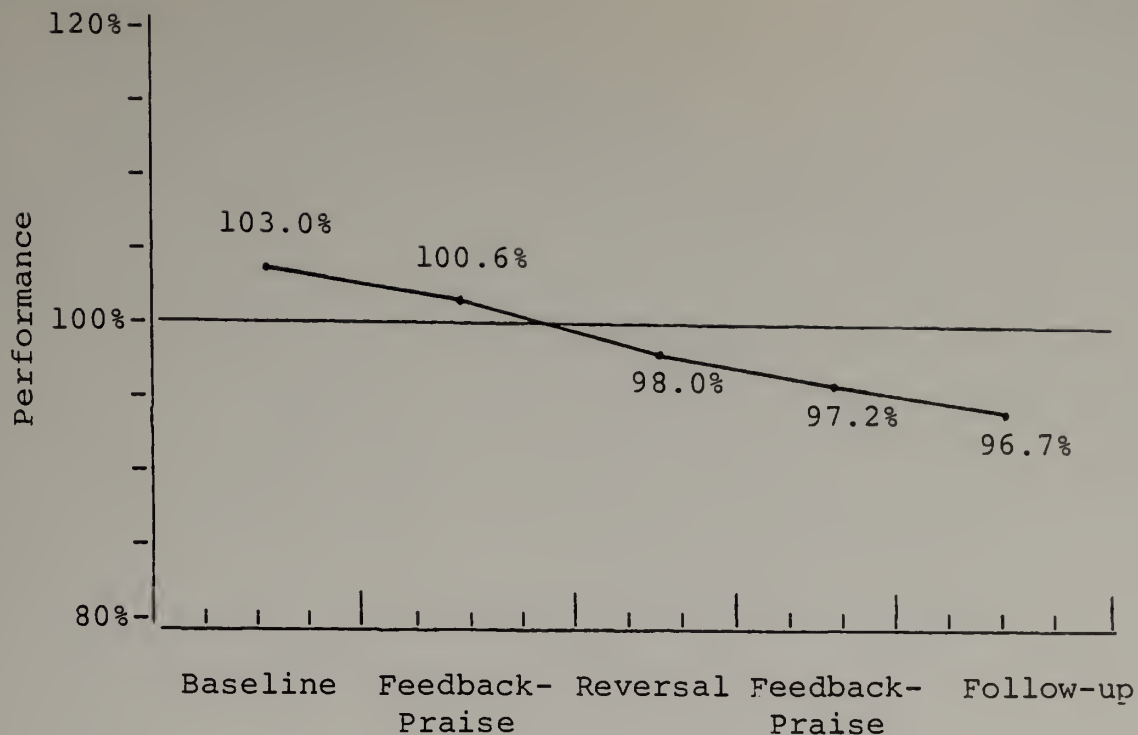


Figure 7. Changes in the Performance of Nine Assemblers with Ten Years or More with the Company.

Here again, this time with regard to time with company, there is evidence which clearly contradicts Hypothesis B. It appears that time with company and job classification were each significant factors in this study.

Position in salary range (assemblers only).

Seven assemblers and one punch press operator (the same employee who had less than one year of time with the company) were being paid at less than 100% of the salary range during the baseline period. While the punch press operator's performance was, once again, very consistent with the performance

of the seven assemblers, her data was omitted from the subgroup because of her job classification.

The seven assemblers improved their performance by 8.6% during the first intervention; decreased their performance by 3.2% during the reversal; improved their performance by 4.7% during the second intervention; and finally, decreased their performance by 5.1% during the follow-up period.

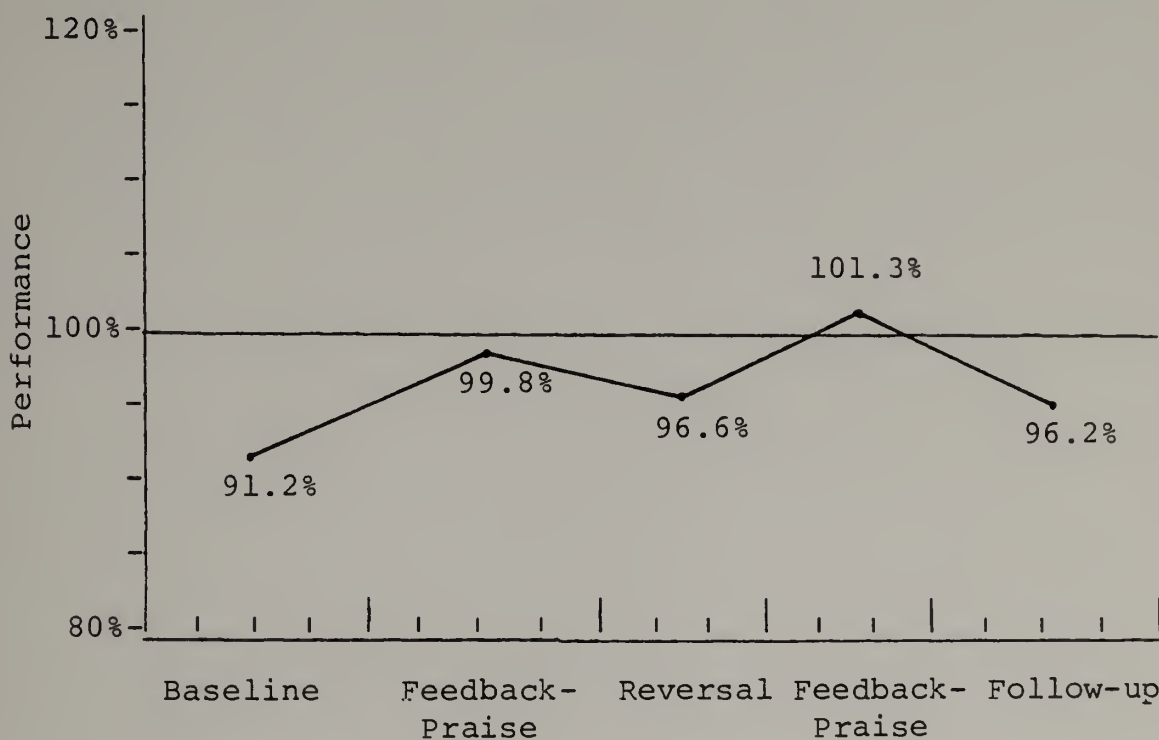


Figure 8. Changes in the Performance of Seven Assemblers Who Were Being Paid at Less Than 100% of Their Salary Range Under Baseline Conditions.

These relatively large changes in performance across stages are clearly inconsistent with the impact of the inter-

vention on the overall work group and, once again, do not support Hypothesis B. These changes are, however, supportive of the efficacy of the feedback-praise intervention on this sub-group. It appears then that position in salary range was a significant factor in this study.

Date of birth.

Age also appears to have been a significant factor in this study. When the 25 assemblers were arbitrarily broken into three distinct sub-groups according to date of birth, the following patterns emerged (see Figure 9).

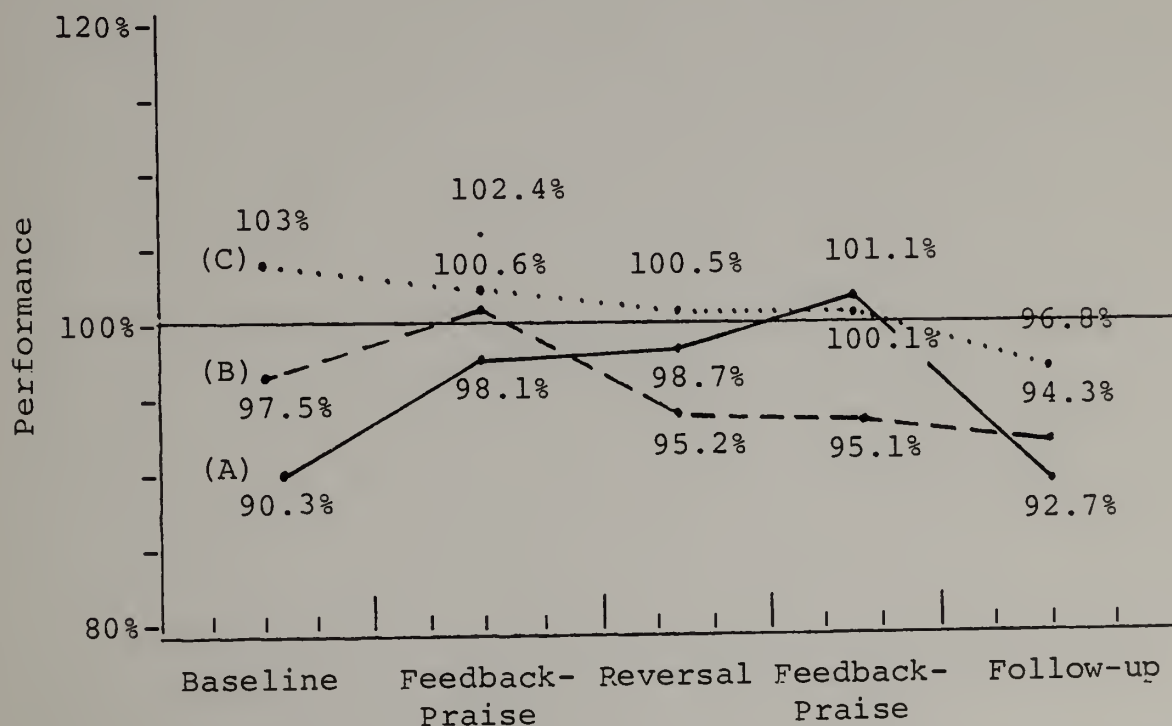


Figure 9. A Comparative Analysis of Performance Change by Subjects Classified by Date of Birth.

Sub-group (A) representing the six assemblers 30 years of age improved their performance by 7.4% during the first intervention. At the same time, sub-group (B), the ten assemblers between the ages of 31-50, improved their performance by 3.1%. Interestingly enough, sub-group (C), the nine assemblers ranging in age from 51-64, actually decreased their performance by 0.6% during this same time frame.

During the reversal, sub-group (A) improved their performance by 0.6%; sub-group (B) reduced theirs by 5.4%; and sub-group (C) reduced theirs by 1.9%.

The second intervention resulted in a performance improvement, once again, of 2.4% for sub-group (A). Sub-group (B) and (C) reduced their performance during the second intervention by 0.1% and 0.4% respectively.

During the follow-up period, all three sub-groups reduced their performance by 9.4%, 0.8% and 3.3% respectively.

These results indicate that date of birth was, indeed, a significant factor in this study for the assemblers. This, of course, contradicts Hypothesis B. The results also indicate that while the feedback-praise intervention was very reinforcing for the assemblers 30 years of age and under, it was not very reinforcing for many assemblers over this age. In fact, performance clearly dropped off for most assemblers

over the age of thirty.

The four line-up and adjust operators, with an average age of 52.3, performed very much in keeping with the assemblers in this age group (see Figure 5). Perhaps even more interesting, however, is the fact that the five punch press operators, with an average age of 45.4, demonstrated significant improvement in performance during this same time frame. This would suggest that age, alone, was not a significant factor for the overall work group.

Hypothesis C

The performance of individual subjects will be consistent with the performance of the overall work group. Accordingly, the group changes in performance will be reflected equally on the performance of a majority of the subjects.

The number of individual employees whose performance was consistent with the overall work group's performance was minimal. Table 6 identifies the number of employees by job classification whose performance was consistent with the aggregate data during any given stage in the study.

TABLE 6

The Number of Employees Whose Performance Was
Consistent With the Performance of the Aggregate Data
During Any Given Stage in the Experiment

Employees	Consistent Performance			B-C
	N	B-C	Reversal	
Assemblers	25	12	10	14
Punch Press Operators	5	3	3	5
Line-up and Adjust Operators	4	0	0	0
Overall	34	15	13	19
Percent Consistent		44.0%	38.2%	55.9%

The actual number of employees whose performance was consistent with the aggregate data across stages was even fewer, as indicated by Table 7.

TABLE 7

The Number of Employees Whose Performance was Consistent
With the Aggregate Data Across Experimental Stages

Stages	Number Consistent	Percent Consistent
A-BC	15	44.0%
A-BC-A	10	29.4%
A-BC-A-BC	6	17.6%

The data in Tables 6 and 7 provide no support for Hypothesis C. While the feedback-praise intervention had some impact on the overall work group (Hypothesis A), and significant impact on several segments of this work group (Hypothesis C), it appears that it had only minimal impact on individual subjects.

Further analysis of the performance of the six employees who were most significantly affected by the intervention, across all experimental stages, indicates a high degree of variability in their daily performance. The standard deviations provided in Table 8 suggest that other variables were significantly impacting on their performance on a daily basis.

TABLE 8

Daily Deviations From Mean Performance For the Six
Employees Most Significantly Affected by the
Feedback-Praise Interventions

Employee Number	Daily deviations from mean performance			
	Baseline	B-C	Reversal	B-C
1	11.0	6.6	9.1	3.3
2	7.4	16.4	15.0	5.8
3	16.6	14.6	2.2	2.2
6	44.0	16.7	20.4	10.5
7	30.0	24.4	23.0	24.2
8	10.1	17.0	8.9	19.6
Average Daily Deviation	19.9	16.0	13.1	10.9

Follow-up

The follow-up period extended from August 29, 1979 to September 21, 1979. During this time frame, the daily performance information, which had been provided to the supervisor during each of the two feedback-praise interventions, was terminated. Without this data, it was impossible for the supervisor to continue the feedback-praise treatment employed during this study.

While demand for production from the subject department

remained relatively constant during this period, the performance of 70% of the subjects declined. The overall decline in working group performance was 4.6%. In those segments of the overall work group where the feedback-praise had been most reinforcing, the return to baseline conditions appears to have had a more significant impact, as indicated by Table 9.

TABLE 9

Segments of the Overall Work Group Most Significantly
Affected by the Return to Baseline,
i.e., Follow-up Conditions

Segment	Decline in Performance
Punch press operators	6.3%
Assemblers, in company 1 year	6.9%
Assemblers, low in salary range	5.1%
Assemblers, 30 years of age	8.4%

A series of follow-up interviews with ten randomly selected subjects was conducted by a company human resource development specialist on September 10, 1979. The questions asked and a summary of his findings are provided below. The specialist had not participated in the program before this time.

Question #1: How often did you receive information about your performance during the course of the summer?

Answer: The responses ranged from "once in a while" to "questioned me every day!" Most indicated that they had received information of this nature quite frequently. No one mentioned the interruption to the feedback process, i.e. the reversal stage.

Question #2: Would you say that you received it (i.e. feedback) once, twice, three, four, or five times per week?

Answer: Seven subjects answered 4-5 times per week. Three answered once or twice per week.

Question #3: How did you get this information?

Answer: Every subject indicated that she received the feedback from the supervisor. Several mentioned that it was a percentage. Several others mentioned that the general foreman gave it to them on a few occasions. One said she had to ask the supervisor for it. This was one of the people who said she only received the information "once a week, if at all".

Question #4: What are your thoughts about this feedback process?

Answer: The interviewer reported that the word "feedback" was consistently misunderstood. Hence, he rephrased the question to "...this type of program?" Five subjects seemed to

be quite positive, responding with "I like the idea", "happy when I make the average", "good idea", etc. They added "bad work hurts my average", "would like it better once a week", and "especially good for new people". The remainder of those interviewed either didn't like it at all or didn't have much to say about it. "I don't like it", "I always give it my best", "made me nervous", and "don't care" were typical responses from this group. Interestingly enough, both groups mentioned "bad work", i.e. poor parts, and parts shortages several times, indicating that these factors hurt their work a great deal.

Question #5: How could we make it work better for you?

Answer: Three subjects recommended that something be done about the "bad work". Two recommended that the data be provided on a once a week or once a month basis. One said it couldn't work better for her because "for 23 years I have always given my best". The rest of the subjects interviewed had no recommendations at all.

The interviewer provided several additional observations in his report. He noted that "the book", i.e. the red ring-binder which the supervisor carried as he made his feedback-praise rounds each day, was often mentioned as a threatening object. So much so, that he recommended that it not be used

in future efforts. He also emphasized the fact that many of the older subjects were very concerned about the "deteriorating quality of parts" they had to work with. He highlighted this point as a critical issue in the department.

Summary

The data collected during the course of this study indicates that the daily feedback and contingent praise from the supervisor did have some impact on the overall group of unskilled subjects, but not as significant an impact as was anticipated in Hypothesis A. Demographic factors such as job classification, time with the subject company, position in salary range, and date of birth, on the other hand, were considerably more significant under these circumstances than was anticipated in Hypothesis B. Finally, the performance of a majority of the subjects was only minimally affected by the feedback-praise intervention. In fact, only six of the thirty-four subjects were significantly affected by the treatment throughout all experimental stages (A-BC-A-BC). This was far less than what was anticipated in Hypothesis C and raises some questions about the predictability of feedback-praise as a change technology in a complex industrial work environment. The implications of these findings for

management and for future research will be discussed in
Chapter V.

CHAPTER V

Discussion

This study addresses three substantive questions: (1) to what extent, if any, will daily feedback and contingent praise from a supervisor, impact on the overall performance of an industrial work group? (2) to what extent, if any, will this treatment impact differently on the performance of selected demographic segments of the work group? (3) to what extent, if any, will the impact of this treatment on individual employees be consistent with its impact on the overall work group?

Each of these questions has been formulated into a separate and distinct hypothesis based upon the existing management literature on behavior modification and the details of the subject work environment. A discussion of the results of this study follows. The implications of these findings for management and for future research are also provided.

Hypothesis A

The first hypothesis focuses on the impact of the feedback-praise interventions on the performance of the overall work group. It suggests that the first feedback-praise

intervention should have resulted in an improvement in overall work group performance $\geq 2\%$. That a subsequent withdrawal of this treatment should have decreased performance by 2% or more. And finally, that a re-introduction of the treatment should have, once again, generated an improvement in performance $\geq 2\%$.

This hypothesis is based upon the assumption that the feedback-praise interventions should have been reinforcing to many members of the subject work group, since such contingencies were not found to exist under baseline conditions (see Chapter III). Daily performance feedback and contingently administered supervisory praise have been recognized by a number of researchers and practitioners (see Chapter II) in recent years as potentially potent reinforcers of performance improvement under such conditions. The sequential introduction and withdrawal of the feedback-praise was required by the A-BC-A-BC experimental design, which was employed in this study as a means of demonstrating the relationship between the treatment and any changes in performance (Hersen & Barlow, 1976; Eisler, Hersen & Agras, 1973). Finally, the degree of significance ($\geq 2\%$) was based upon the fact that the subject company would normally recognize extended improvements in performance $\geq 2\%$ with a comparable merit increase in salary.

During the course of the first feedback-praise intervention, the performance of the overall work group actually improved by 2.2% over the baseline performance. Withdrawal of this treatment during the reversal stage resulted in a 2.0% reduction in performance. These changes in performance in response to the A-BC-A experimental design provide limited, but significant, evidence in support of the efficacy of the first feedback-praise intervention (Komaki, 1978).

When the treatment (BC) was re-introduced in accordance with Hypothesis B, the performance of the overall work group improved by 0.8%. Had the change been $\geq 2\%$, it would have enhanced the argument that it was the treatment, and not other variables, which had caused the improvement. The overall work group data is therefore supportive of the efficacy of the feedback-praise intervention but not to the degree of significance required by Hypothesis A.

The results suggest that the performance of an industrial work group, composed of a mixture of high and low performers, can be improved through the presentation of daily feedback and contingent praise by a supervisor. The results also indicate that the potency of such reinforcement will diminish rapidly over time.

Implications for management.

1. The response of the overall work group to the initial feedback-praise intervention and the subsequent reversal suggests that the performance of an industrial work group is, to some degree, contingent upon these consequences. Since these "natural reinforcers" are readily available in all work environments, management would do well to explore the nature of this contingency further. The potency of future feedback-praise interventions in the subject work group, for example, could perhaps be enhanced if the relative impact of the treatment on the membership of the work group was more fully understood.

2. The apparent reduction in the potency of the treatment during the second intervention cannot be explained from the normative data alone. Other factors, such as parts availability, demand for production, the temperature at the mill, etc., must also be considered. No single factor, such as feedback-praise, can explain the performance of employees in a complex industrial work environment.

In this particular situation, the demand for production and the parts problems were relatively constant. There were no major fluctuations in either of these areas during the course of the study. The weather, on the other hand, did

differ significantly during the course of the study, with the temperature and humidity reaching "heat wave" conditions during the reversal period and well into the second intervention (see Limitations section below). This climate factor may explain the apparent reduction in the potency of the treatment.

Once again, however, the degree to which the climate factor was significant cannot be determined from an analysis of the normative work group data alone. A clear analysis of the relative impact of this extraneous variable on the performance of various segments of the work group, and on each member, is also needed (see Hypothesis B and Hypothesis C below).

Implications for future research.

1. The value of the A-BC-A-BC reversal design is clearly demonstrated by this study. A before-after analysis, for example, would have revealed little more than an initial surge in performance by the work group after the first intervention. Efficacy would not have been established nor would the diminishing potency of the feedback-praise treatment during the second intervention have been observed. This experimental design is very useful in a complex work environment.

2. The single-case reversal design (A-BC-A-BC) used in

this study permits a close examination of the effect of the feedback-praise intervention on selected segments of the overall work group (Hypothesis B) and on individual subjects (Hypothesis C) as well. Experimental designs which do not permit such analysis may generate misleading conclusions. Unfortunately, few of the case studies and controlled experiments in the management literature provide more than normative data for analysis. Future studies should employ designs which will permit idiographic analysis as well.

Hypothesis B

The second hypothesis suggests that the feedback-praise interventions should not have impacted differently on subjects with different job classifications, time with the subject company, positions in the salary range, and/or dates of birth. It was assumed that the performance of any given demographic segment of the overall work group would have been relatively consistent with the aggregate data.

This hypothesis was based upon the contention that every work group is composed of a complex mixture of employees with distinctively unique histories of reinforcement. Since an individual's history of reinforcement is recognized by behaviorists as the primary determinant of the potency of any given

reinforcer (Skinner, 1953), it was assumed that no clear pattern of responsiveness would emerge along demographic lines. Little importance has been given to demographic variables in the management literature on behavior modification for this very reason.

The results of this study, however, suggest quite strongly that demographic variables such as job classification, time with the subject company, position in the salary range, and, to some degree, age, were all noteworthy. The impact of the feedback-praise interventions varied considerably along these lines.

Job classification.

The most obvious example of the degree to which performance varied in this area is provided by comparing the performance of the five punch press operators with the four line-up and adjust operators.

The punch press operators improved their performance by 6.4% during the course of the study and demonstrated a significant "saw-tooth" pattern in their performance. The treatment was clearly reinforcing of performance improvement for them. The line-up and adjust operators, on the other hand, performed in exactly the opposite pattern, and actually reduced their performance by 2.9% within the same time frame.

Time with the subject company.

Of the twenty-five assemblers in the study, ten had been with the company less than one year. Their performance improved by 7.3% during the study; they also demonstrated a significant "saw-tooth" pattern in their performance. Nine of their peers, with more than ten years of time with the company, decreased their performance by 5.8% within the same time frame.

Position in salary range.

One of the most significant responses to the treatment came from the seven assemblers who were being paid at less than 100% of their salary range under baseline conditions. Their performance improved 10.1% during the course of the study and very clearly reflected the "saw-tooth" pattern, indicative of the efficacy of the feedback-praise interventions. Six of their peers, who were being paid at the top of the salary range, decreased their performance by 4.4% at the same time.

Date of birth.

Six subjects ≤ 30 years of age improved their performance by 10.4% during the course of the study, while the performance of their more senior peers (≥ 50 years) decreased by 6.2% within the same time frame. It is important to note, however,

that the data on this segment of the overall work group is not significantly supportive of the efficacy of the feedback-praise interventions as it was in other demographic areas. During the reversal stage, the performance of this segment of subjects (≤ 30 years) did not decrease by the 2% needed to demonstrate a functional relationship. While the data is supportive of efficacy, it is not in accordance with established criteria for significance.

Of these four demographic variables, position in salary range emerges as the most reliable criteria for prediction of a positive response to the treatment. As a general rule, subjects who were being paid lower in their salary range responded much more favorably to the feedback-praise than their higher paid peers, regardless of job classification, time with the subject company, or date of birth.

This was undoubtedly due, in large part, to the fact that it was actually easier for lower paid subjects to generate positive feedback and praise. An individual being paid at 90% of the salary range had to exert far less effort in order to generate an increase in performance than did a subject being paid at 110%. It appears that the potency of the feedback-praise as a reinforcer is directly related to the amount of effort required by a subject in order to receive it.

Implications for management.

1. The results indicate that the predictability of success for future feedback-praise interventions can be greatly enhanced by an analysis of demographic variables such as job classification, time with company, position in salary range, and, to some degree, date of birth. Subjects within these categories appear to have shared a common history of reinforcement with regard to the subject work situation, and therefore responded in a similar manner to the treatment. The data also suggests that a subject's position in the salary range, more than the other demographic variables, should be considered by management in the design of future feedback-praise efforts for the subject work group.

2. The potency of the feedback-praise interventions appears to be related to the amount of effort required in order to generate such consequence in the work setting. Management would therefore be wise to limit the use of feedback-praise to newer employees. The more experienced, higher paid employees did not find the intervention reinforcing. In fact, they actually reduced their performance during the study, suggesting that they may have found the daily feedback and praise from the supervisor to be aversive. Their histories of reinforcement with regard to the job were

clearly different from their more junior peers, and their response to the treatment was consistent with these differences.

3. The potency of the feedback-praise intervention for certain segments of the subject work group with regard to improved productivity, may be indicative of the potential of such reinforcement for performance improvement in other areas, e.g. absenteeism, tardiness, and quality of work.

4. The costs associated with this study were minimal. Existing time standards were utilized without modification. The transfer of the performance data for sixty subjects from the computer printouts to the individual feedback sheets took less than an hour of clerical time per day. The presentation of the feedback-praise took the supervisor an average of thirty-one minutes per day; which amounts to less than fifteen seconds per day per subject. Finally, the initial training time for the supervisors took less than two hours. Had the program been limited to subjects being paid less than 100% of the salary range, the cost effectiveness of the program would have been substantially greater.

Implications for future research.

1. The demographic analysis revealed that the treatment was more reinforcing for some segments than others. Without

this demographic information, the performance of the overall work group, as discussed with regard to Hypothesis A, could not have been adequately explained. From a normative perspective it appeared that the "heat wave" may have been the cause of the apparent reduction in the potency of the treatment. The demographic analysis revealed, however, that in spite of this factor, some subjects responded very favorably to the interventions. An analysis of behavior programs which does not take demographic data into consideration can be misleading. Future studies should pay particular attention to variability in performance along demographic lines. The predictability of behavior modification efforts appears to be dependent upon such analysis.

Hypothesis C

The third and final hypothesis suggests that the performance of the individual subjects under the study conditions should be consistent with the performance of the overall work group. In other words, the group changes in performance should be reflected equally in a majority of subjects.

Discussions of behavior modification programs in the management literature generally refer to the impact of these intervention(s) on overall work group performance (see Chapter

II). Few studies provide a detailed analysis of the impact of the treatment on the individual subjects. In these studies, it is more or less implied that a majority of subjects responded favorably to the treatment.

By utilizing a single-case experimental design, it has been possible to determine the relative impact of the feedback-praise treatment on each of the subjects in the study. The appropriateness of assumptions about "broad brush" effects can therefore be examined more closely.

Interestingly enough, the results provide no support for Hypothesis C. The number of employees whose performance was consistent with the overall work group was minimal. Only ten subjects (29.4%) were consistent through the first intervention and reversal stages (A-BC-A); and only six of these subjects (17.6%) remained consistent throughout the second intervention as well.

Further analysis of these six subjects indicates that there was a high degree of variability in their daily performance. The average standard deviation was greater than ten percentage points on any given day. This data suggests that other variables were significantly impacting on individual performance on a daily basis.

Implications for management.

1. While the normative data indicates that the interventions were, in fact, significantly reinforcing over time for certain segments of the subject work group, the single-case analysis suggests that the interventions were not able to modify the day-to-day performance of a majority of subjects in a predictable manner. Other conflicting stimuli were also impacting on daily performance, e.g. the highly publicized "heat wave", lack of work, and the availability and quality of parts. Each of these factors should also be addressed as a part of a comprehensive performance improvement program.

2. The day-to-day deviations in individual performance indicate the need for a more systematic approach to performance improvement in the subject work group. The study addresses a significant contingency for many employees, but many other important factors, e.g. poor quality and parts shortages, "make work" situations when parts were not available, et.al., were not addressed. Performance problems are frequently a function of both technical and behavioral inadequacies, as they were in this situation. Theoretically, both should be addressed in a comprehensive performance improvement program.

3. The use of a comprehensive, systems approach to per-

formance problems would permit both social and technical problems to be addressed as integral parts of an overall performance improvement plan. However, this study indicates that when the technical problems cannot be immediately resolved, management can still use feedback-praise with selected segments of the work force in order to improve performance. Under such circumstances, the schedule of reinforcement should be carefully controlled; perhaps beginning with a daily, continuous schedule such as the one used in this study, but ultimately moving to an intermittent schedule where feedback and contingent praise are only presented once or twice per week. The continuous schedule used in this study emphasizes the inability of the employee to control her performance in an environment where there are conflicting stimuli, such as parts shortages, et. al. Under such circumstances, the feedback-praise can become an aversive stimuli.

Implications for future research.

1. The relative potency of the daily feedback-praise interventions on individual performance was clearly pointed out by the single case, reversal design. The complexity of the work environment was also pointed out as a result of this analysis vis a vis the normative data. The design appears to be ideally suited for behavior analysis in complex

work environments and should be utilized more extensively in future studies.

2. Few studies in the management literature on behavior modification provide both single-case and normative data. Without both types of data it is difficult to determine the relative worth of a behavioral intervention. Analysis of the normative data alone, for example, can be misleading; as was pointed out in the earlier discussion in Hypothesis A about the degree to which the "heat wave" may have been the cause of the apparent reduction in the potency of the feedback-praise during the second intervention. Strict idiographic analysis, on the other hand, can minimize the likelihood of discovering that employees from certain demographic segments may respond to the same interventions in a similar manner. Analysis from both perspectives can be highly revealing. Future studies should employ designs which will permit both types of analysis.

Limitations of the Study

The research design, i.e. A-BC-A-BC reversal, permits the investigation of the relationship between the feedback-praise intervention employed and the resulting changes in performance. The uniquenesses of the subject work group,

however, and the complexities of the subject work environment place limitations on the degree to which these findings can be generalized to other work settings. Some of the more significant factors to be considered are discussed below:

1. The subjects in the study included five punch press operators, four line-up and adjust operators, and twenty-five assemblers; all members of a ring-metals assembly department in a large ring-binder manufacturing facility. Their ages, experience and salaries varied widely. All were women and all but five were white.

2. The supervisor was a long term employee who was highly regarded by all levels of management. He had recently been elected for a second term as president of the Foreman's Association. The supervisor was fifty years of age, white and male.

3. The subjects analyzed in this study represented approximately 56% of the population of the department. The balance consisted of student summer employees and other full-time employees who had either missed more than two weeks of work during the course of the study or missed an entire work week at the beginning of one stage of the study or another.

4. The weather varied greatly throughout the course of the study. It was particularly hot and humid during the re-

versal stage and also during part of the second intervention. Temperatures at this time were in the high eighties and low nineties, with hazy skies, making working conditions in the five-story, 100-year-old mill very uncomfortable for most people. The media referred to this "heat wave" as one of the worst on record due to its duration.

5. Coincidentally, eight of the thirty-four employees received merit increases on the first day of the reversal period. While their performance data was adjusted to accommodate their new performance standards, the impact of the merit increases on the subjects cannot be controlled. Two of these subjects were punch press operators. Six were assemblers. All had less than five years with the company.

6. While the company's demand for production from the work group remained constant throughout the study, the availability of the parts needed to meet this demand varied considerably from day to day. In addition, when parts were available, they often included a high amount of "badk work", i.e. poor quality. This fact was pointed out numerous times by the supervisor and the manager of the time standards during the course of the study. It was also pointed out by several of the ten subjects interviewed during the follow-up period.

Recommendations for Management

1. The value of behavior modification as an organization development technique is heavily dependent upon its ability to improve the performance of entire classes of behavior in a predictable manner. This study suggests that the analysis of performance according to such demographic variables as job classification, experience, position in salary range and, to some degree, age, can enhance our ability to pre the success of behavior modification programs. Such analysis is highly recommended.

2. Along these same lines, we would do well to avoid the presentation of feedback-praise to employees who are already performing in excess of standard. Many of the subjects in this study who were performing very well under baseline conditions, actually found the feedback-praise to be aversive and reduced their performance accordingly. Figure 10 compares the ten highest performing subjects in the overall work group, under baseline conditions, with the ten lowest performing subjects.

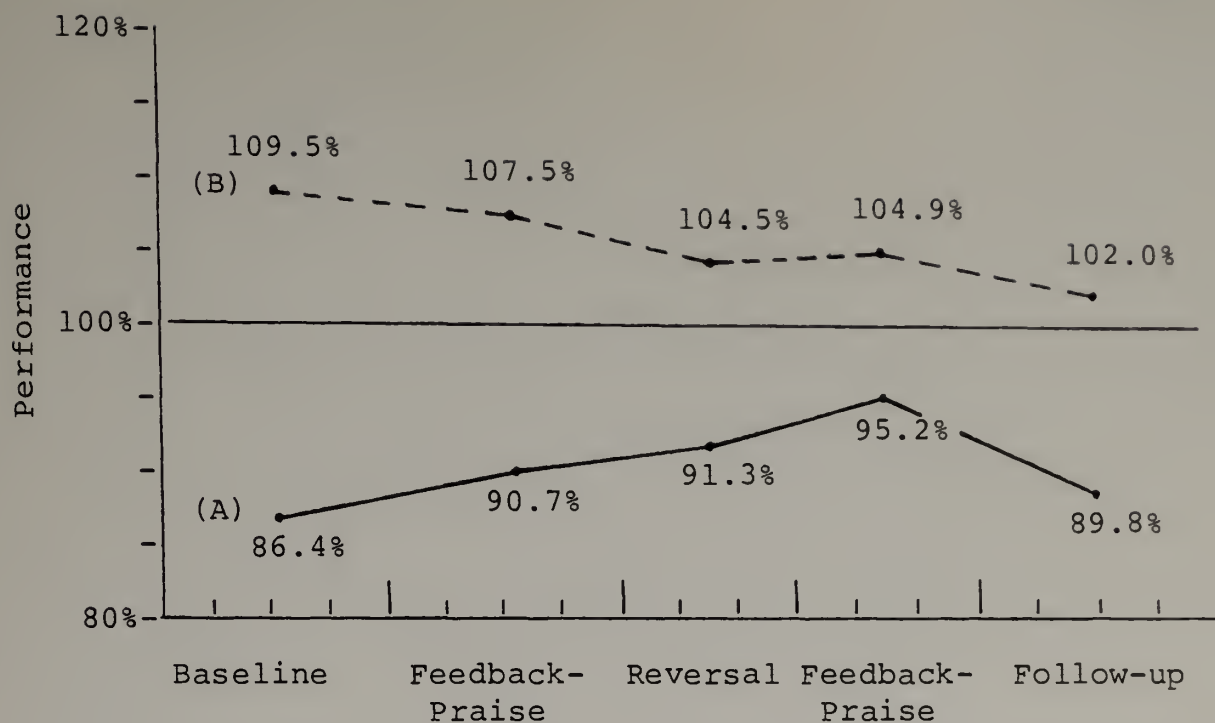


Figure 10. A Comparative Analysis of the Ten Highest Performing Subjects Under Baseline Conditions With the Ten Lowest Performing Subjects.

The results indicate that while the lower performing group (Group A) was steadily gaining ground throughout the study, their higher performing peers (Group B) were steadily decreasing their performance. Interestingly enough, members of Group A were twelve years younger than Group B, were being paid 12% lower in their salary range, and had approximately two years less experience per person.

3. The behavior modification procedures outlined by Luthans & Kreitner (1975) and Miller (1978) should be followed closely once the target performance has been identified.

These procedures require a careful analysis of the specific contingencies of reinforcement impacting on each subject, e.g. performance expectations, parts availability, physical effort required to generate reinforcement, etc.

4. Given modern electronic technology, it is entirely possible and economically feasible to develop a shop-floor information processing capability which will convert an employee's time ticket into immediate performance feedback. Employees currently submit a time ticket which is screened, entered into a system, and, at some later point processed for accounting purposes. As an alternative, the data entry, screening, processing and accounting could all be done in seconds on the shop floor. Employees would get immediate feedback on their daily performance. Supervisors would get immediate information about the performance of their work group, and accounting would have their records immediately updated. The potential benefits of such a system in terms of performance improvement and accounting efficiencies should be well worth the costs.

Recommendations for Future Research

1. The management literature on behavior modification provides very little information about the degree to which

behavioral interventions have impacted on various segments of the work force. Since the potency of any given reinforcer is directly related to the reinforcement history of the subject, it follows that individuals with similar reinforcement histories, with regard to a given work situation, will be reinforced to a similar degree by the same consequence. An analysis of the literature in light of selected demographic variables could provide information which would enhance our ability to predict the success of future behavioral interventions.

2. This study focused on the effect of a feedback-praise intervention in an industrial work setting. It did not permit an analysis of the relative impact of the feedback vs. praise on performance. An analysis of feedback alone under similar circumstances would be noteworthy. Should the feedback be distributed indiscriminately to all? or should it be presented on a contingent basis, as a consequence of improved performance only? Similarly, can contingent praise alone be a sufficient reinforcer? Will it be a more potent reinforcer than feedback-praise combined? Answers to these questions would also enhance our ability to predict the success of certain behavioral interventions.

3. Finally, while it is often difficult for management

to justify the use of A-B-A reversals, this design is an extremely practical research tool for use in complex industrial work environments. The multiple-baseline design also provides a very valuable means of studying behavioral interventions. The multiple baseline design is clearly preferable when the program will not have to be terminated at the end of the study, since it is not necessary to interfere with performance improvements.

Summary and Conclusion

The functional relationship between a feedback-praise intervention and performance improvement for specific segments of the work force has been clearly demonstrated by this study. It appears that this intervention was particularly reinforcing for subjects (1) with less than one year in the company, (2) who were being paid in the lower end of their salary range, and (3) were less than thirty years of age.

For the more senior assemblers, the intervention was not as reinforcing. For many it was clearly aversive. This was also true for the line-up and adjust operators who were also very senior and highly paid.

While the limitations in the study prevent further generalization of the results, it is reasonable to conclude that (1)

feedback-praise interventions can be used to generate performance improvement in a complex industrial work environment;

(2) that demographic segmentation of the work force can enhance predictability; and (3) that feedback-praise is not universally reinforcing.

Where earlier organization development activities and research have concentrated, for the most part, on setting the occasion for performance improvement through greater awareness, skill-building, priority setting, etc., behavior modification programs, like the feedback-praise interventions utilized in this study, focus more heavily on the maintenance and control of organization behavior once it has been generated. Through the ultimate integration of these two emerging approaches, a more predictable impact on performance can be anticipated.

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APPENDIX A

Performance Feedback Program

	M	T	W	T	F	S	M	T	W	T	F	S	M
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APPENDIX B

PERFORMANCE FEEDBACK PROGRAM

<u>Date</u>	<u>Start</u>	<u>Stop</u>	<u>Elapsed Time</u> <u>(Minutes)</u>
6/19/79	7:23	8:04	41
6/20/79	7:25	7:58	33
6/21/79	7:30	8:08	38
6/22/79	7:30	8:05	35
6/25/79	7:25	8:00	35
6/26/79	7:40	8:15	35
6/27/79	--	--	--
6/28/79	7:40	8:18	38
6/29/79	7:30	8:00	30
7/2/79	7:21	7:55	34
7/3/79	7:40	8:04	24
7/5/79	7:30	7:57	27
7/6/79	7:40	8:10	30
7/9/79	7:30	7:52	22
7/10/79	7:39	8:00	21
7/11/79	--	--	--
7/12/79	7:45	8:20	35
7/13/79	8:00	8:20	20
8/2/79	7:40	8:03	23
8/3/79	7:30	8:00	30

Elapsed Time
(Minutes)

<u>Date</u>	<u>Start</u>	<u>Stop</u>	
8/6/79	7:22	4:40	18
8/7/79	7:40	7:55	15
8/8/79	7:32	8:10	38
8/9/79	7:40	8:20	40
8/10/79	7:45	8:40	55
8/13/79	7:42	8:25	43
8/14/79	7:35	8:05	30
8/15/79	7:55	8:30	35
8/16/79	7:25	8:20	55
8/17/79	7:59	8:26	27
8/20/79	7:45	8:03	18
8/21/79	7:20	7:40	20
8/22/79	7:15	7:40	25
8/23/79	7:40	8:00	20

APPENDIX C

Transcript of Training Session

As the company continues to grow, it is becoming increasingly difficult to manage our employees effectively. As a supervisor, it is particularly difficult to manage upwards of 70 people and do the kind of job that you want to do. I'd like to talk to you today about a new performance improvement program. We've designed this program to help you to improve performance and reach budget in your particular area.

What we'd like to do today is focus on several questions which must be answered in order to implement any new program. First of all, what are we trying to accomplish? Secondly, how are we trying to do this? Third, who is going to be involved? Fourth, why are we doing this in the first place? And finally, how about a demonstration of how we should be doing this performance improvement program in the factory?

With regard to what we are trying to accomplish, our primary goal is to improve performance in the factory. When performance goals are achieved, you remain on budget; when they are not met, you go below budget. What we are trying to do is help you to improve performance in your particular department. This effort will use minimal time and require minimal effort on your part.

But how are we going to do this? In essence, we are

going to do it systematically. As I said before, you and your people are required to attain certain results from your department. What we'd like to do is help you to improve that performance by looking a bit more closely at the system that we are working with in the factory. In essence, we're going to recommend that you provide feedback to your people on a daily basis about their performance. Feedback can be developmental. It can be correcting. It can also be very reinforcing for the employee. Developmental in a sense that maybe the employee isn't sure that what she or he is doing is, in fact, what they should be doing. Feedback about results, coming the following day or the day after, will tell them how well they are actually doing. Feedback will be correcting in the same sense. The individual operator will find out what she's been doing right or what she's been doing wrong. Finally, it will be reinforcing. I will talk more about what we mean by reinforcement in just a few minutes.

Feedback, coupled with an acknowledgement on your part of performance improvement, can help us to improve performance in your department. Here's how. Performance in your department is dependent upon the consequences of performance. On a daily basis, you guide and direct your people to perform in a certain fashion. At the end of any given day, your people

will either receive support for what they've done, no response whatsoever, or perhaps even a negative reinforcement like an assignment which they don't particularly like. We have to be aware of the type of consequences our employees receive at the end of any given day.

What we want to do during our performance improvement program is to acknowledge performance improvement on a daily basis with a positive consequence. The way to do this is to give feedback to people on a daily basis and acknowledge performance improvement at the same time. This rewarding consequence will strengthen the preceding behavior. What we are saying here is that performance improvement, when coupled with a positive reinforcing consequence, stands a greater chance of coming back again the next day. We're going to emphasize the positive consequences of performance improvement during the summer months.

Who will be involved? Specifically, the supervisor will be involved. Each day the supervisor will give performance feedback and positive reinforcement, when appropriate, to each and every individual in the department. The division accountant will also play a key role. It will be the responsibility of the division accountant to transfer the information from the computer printouts to the feedback sheets between 6:30

and 7:00 a.m. each day. This information will then be placed in a ring binder, as we have here, and given to the supervisor so that he can give this information to the individual employees first thing each morning.

The manager of time standards and the assistant controller are very much involved in this part of the program in order to make sure that material shortages, equipment problems, etc., are also accounted for in our research. We want to be able to explain the performance in every way possible during the course of the upcoming months. The division managers, the general foreman, and the personnel manager will each be heavily involved in the project, helping us to make a decision as to whether or not we will want to continue this program after the summer months. As Manager of Human Resource Development, I will also be involved with the implementation of the program and helping to make a decision as to whether or not we should continue with it in the future as well.

Why are we doing this? Well, first of all, we talked in the very beginning about the importance of improving performance. We are also talking about doing something that is easy to do and requires very little time. Performance feedback and praise can be most helpful in this regard. To manage this situation, a supervisor has to have information

about how his people are doing. What we will be trying to do is give you information about how your people have been performing so that you can pass this information on to them on a regular basis. As I said before, feedback helps them to correct their performance, it helps them to develop, and it reinforces them for the kind of performance that we want.

There have been many successes reported with regard to this type of performance improvement and reinforcement program. Unfortunately, very little research has been conducted to prove that it is, in fact, the feedback-praise programs which are having the impact upon performance in these factories. This program has been specifically designed to help us to address this issue directly.

I'd like to give you a little demonstration of how this can be done on a daily basis. Between 6:30 and 7:00 a.m. each day, our accountants will transfer data from the printout to the ring binders. Now what we'll be doing is looking, in a few minutes, at a handout that I put together with specific guidelines which state that it's very important for our division accountants to have that information ready every morning at 7:00 a.m. so that the supervisor can give it back to the employees. There is something else that the accountant will be required to do. We will be asking the accountant

to measure the amount of time it takes for the supervisor to give this information back to the employee between 7:00 and 8:00 a.m. Our goal is to have the information fed back to all 60 employees within less than 30 minutes each day. We're going to record the supervisor's performance every single day and make sure that we do just that.

The supervisor will feed back the data, and will acknowledge any performance improvement to the employees on a daily basis. Once again, we have specific guidelines (see Chapter-II) that you will be looking at in a moment. More specifically, what we want the supervisor to do is to present this feedback on a daily basis and to be as consistent as possible.

The division accountant will report to the supervisor the elapsed time required to present the feedback and praise and then bring the ring binder back to me. You can call me at any time if you have any problems or concerns with regard to this project. I will be making a specific attempt to be available, particularly in the first few weeks as we get the project underway. Also, if you happen to see me walking in the factory during the course of this program, and you are giving the feedback to your people, please do not stop to talk to me. All I'll be trying to do is to try to see if we can develop a better way of doing it; perhaps identify

ways that you are actually doing it.

Finally, I'd like to show you how easy it is to give feedback to the individual. What we'll be doing is taking a ring binder around to every employee. You'll see the employee and perhaps the employee's name is Jones. Everything in the ring binder is listed alphabetically. As you can see, the employees' names are listed in alphabetical order and all you have to do then is open up the book and you'll see the employee's performance for at least the last two weeks. What you are going to do is go to the last recorded day and you'll see 107%, and there's an arrow next to it. You'll say to the employee, "your last day's performance was recorded at 107%; good job". Since there is an arrow next to this number, it is appropriate to give praise.

I'll say it again and show you exactly how it'll be done. You'll see the employee and walk up to her and say, "yesterday you did 107%; now that's performance improvement; good job". See who the next employee is, check their performance in your ring binder. If there is no arrow next to the data, you would simply say, "the last day your performance was recorded you had 88%". Move onto the next person.

It's a very simple procedure, it's not something that's going to take a great deal of time. As you can see, we'll be

spending less than 30 seconds with each person. As the guidelines indicate, a supervisor will not have time during the course of the feedback sessions to discuss the information. If someone wants to discuss it, tell them that after you make your feedback rounds, you'll be back to talk about it with them. Make sure you get back to them after that time period.

To wrap this whole thing up, then, what we're talking about is trying to improve performance in your particular department. We're trying to meet a specific request of the employees for more information as well. We're also trying to do this with minimal effort.

We're trying to do this by focusing very specifically on the results of the previously recorded day's performance. We're trying to help the employee understand how she is doing and then acknowledge any performance improvement, no matter how small, on a daily basis.

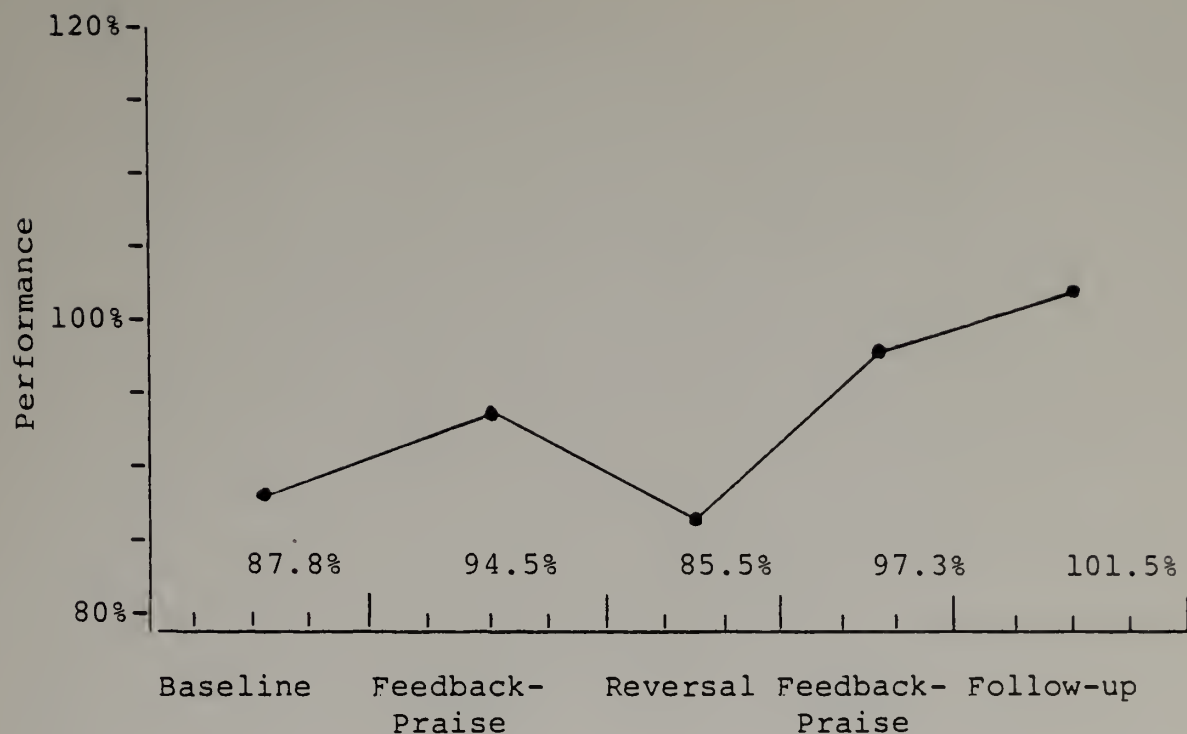
Who's involved? Once again, the supervisor is the key character in this particular program. The supervisor will be responsible for taking information around on a daily basis to each and every individual and acknowledging performance improvement on a consistent and regular basis. The accountant will be responsible for putting this information together between 6:30 and 7:00 in the morning during the

research period, which will extend throughout the entire summer. Finally, the division manager, the manager of the time standards, the assistant controller, myself, and the personnel manager will be heavily involved in looking at the data on a regular basis to determine whether or not this is a program that we should continue throughout the company in the fall.

Why are we doing this? It appears that knowledge of results, tied in with acknowledgement of performance improvement, is a very powerful management tool. If we're correct, it is a very simple tool to learn, yet it's a very powerful tool to use. It has many reported successes, as we can see in this article from Business Week of January of this year. Over 100 major corporations are now using this program. Unfortunately, there is very little research to prove that it is, in fact, the feedback-praise programs which are having the favorable impact on productivity. We're going to be looking at that very, very closely.

Finally, as far as budgetary concerns go, this company is in business to make a profit. What we're trying to do is make sure that we improve employee productivity in your particular work area. I'd like to wish each of you a personal good luck with the project. Once again, do not hesitate to call if I can help you in any way.

APPENDIX D

EMPLOYEE PERFORMANCE REPORTSubject No. 1

Job Classification

X Assembler

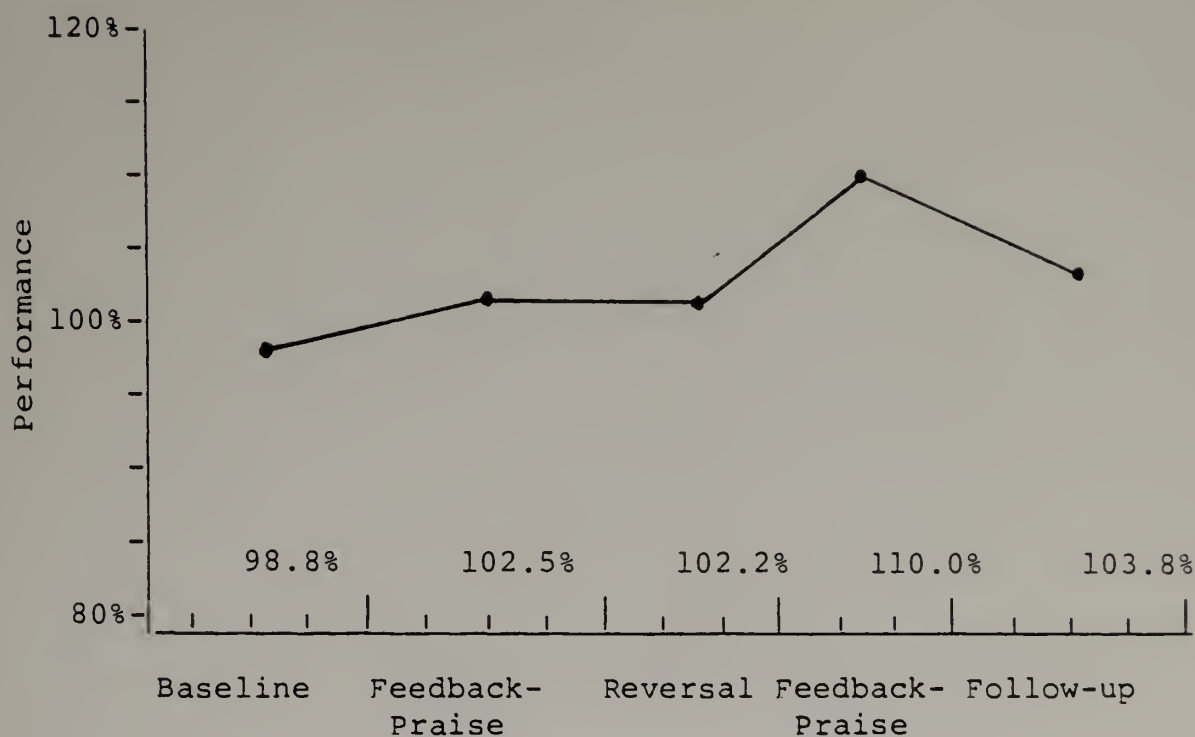
Punch Press Operator

Line up and Adjust Operator

Time with company < 1

Position in salary range

Before July review 94%After July review 94%Age 19EEO Code: Black White X Hispanic

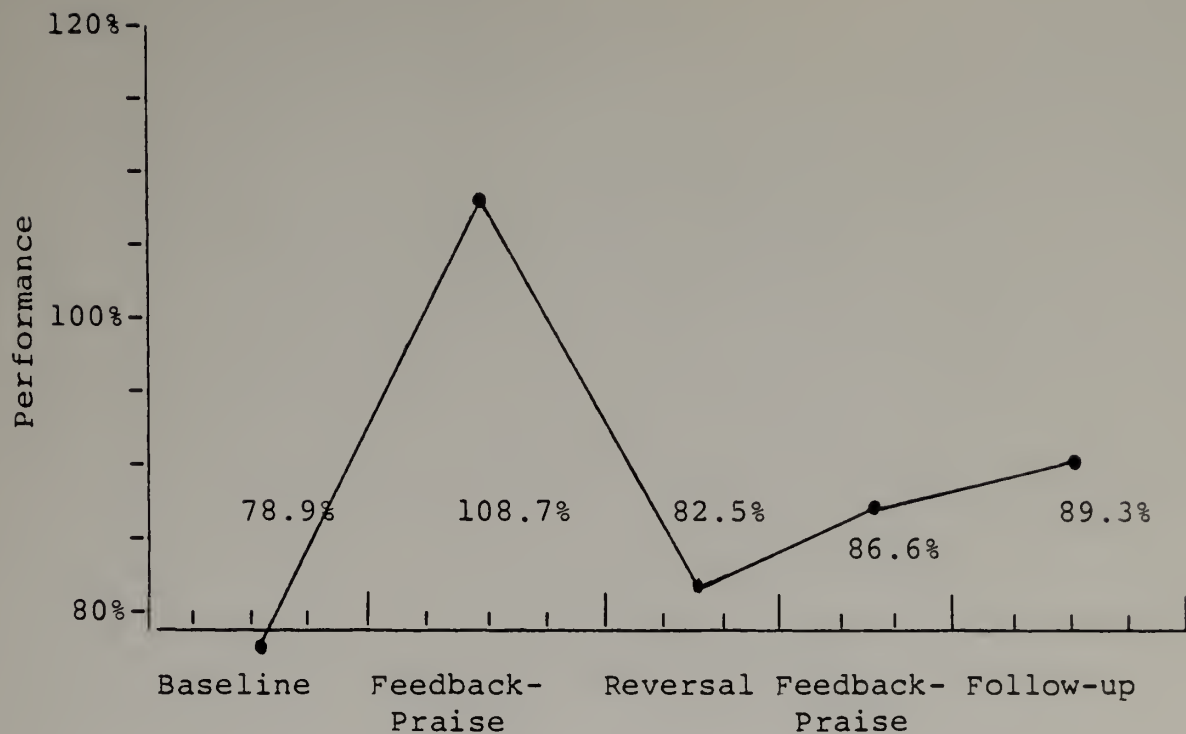
EMPLOYEE PERFORMANCE REPORTSubject No. 2

Job Classification

☒ Assembler☐ Punch Press Operator☐ Line up and Adjust OperatorTime with company 1

Position in salary range

Before July review 104%After July review 108%Age 51EEO Code: Black ☐ White ☒ Hispanic ☐

EMPLOYEE PERFORMANCE REPORTSubject No. 3

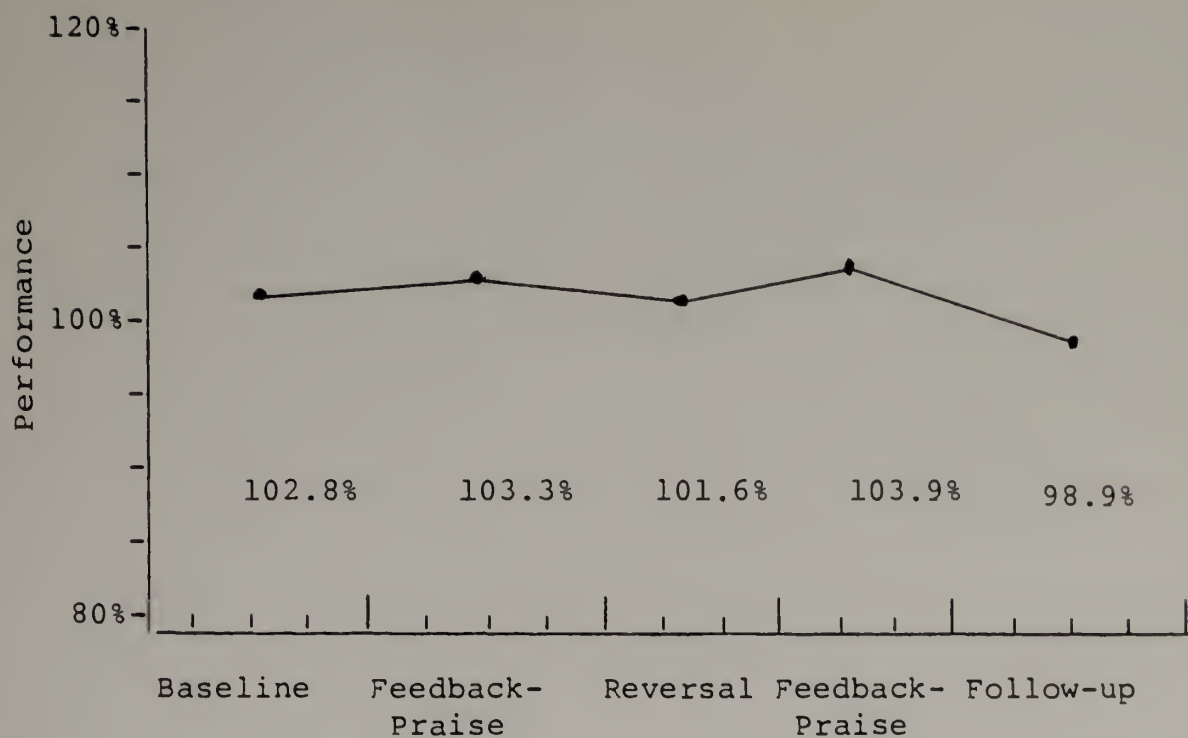
Job Classification

☒ Assembler☐ Punch Press Operator☐ Line up and Adjust OperatorTime with company 1

Position in salary range

Before July review 91%After July review 91%Age 46EEO Code: Black ☐ White ☒ Hispanic ☐

EMPLOYEE PERFORMANCE REPORT



Subject No. 4

Job Classification

☒ Assembler

☐ Punch Press Operator

☐ Line up and Adjust Operator

Time with company 1

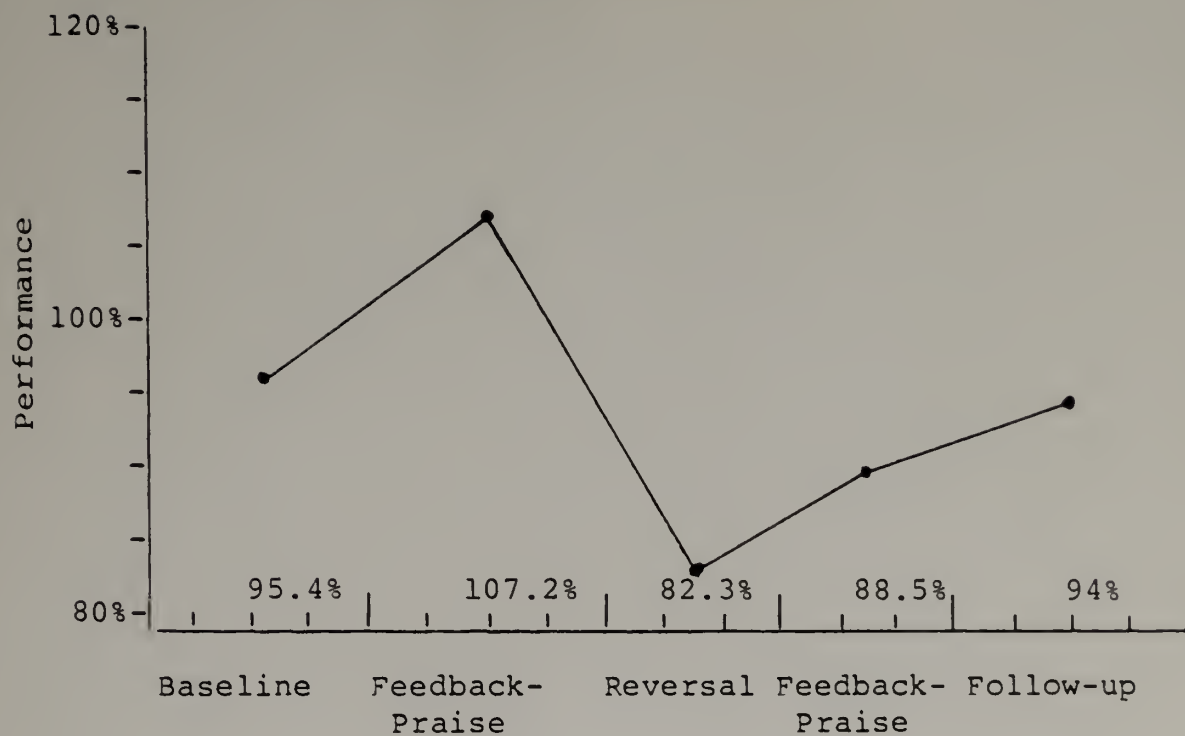
Position in salary range

Before July review 125%

After July review 125%

Age 42

EEO Code: Black ☐ White ☒ Hispanic ☐

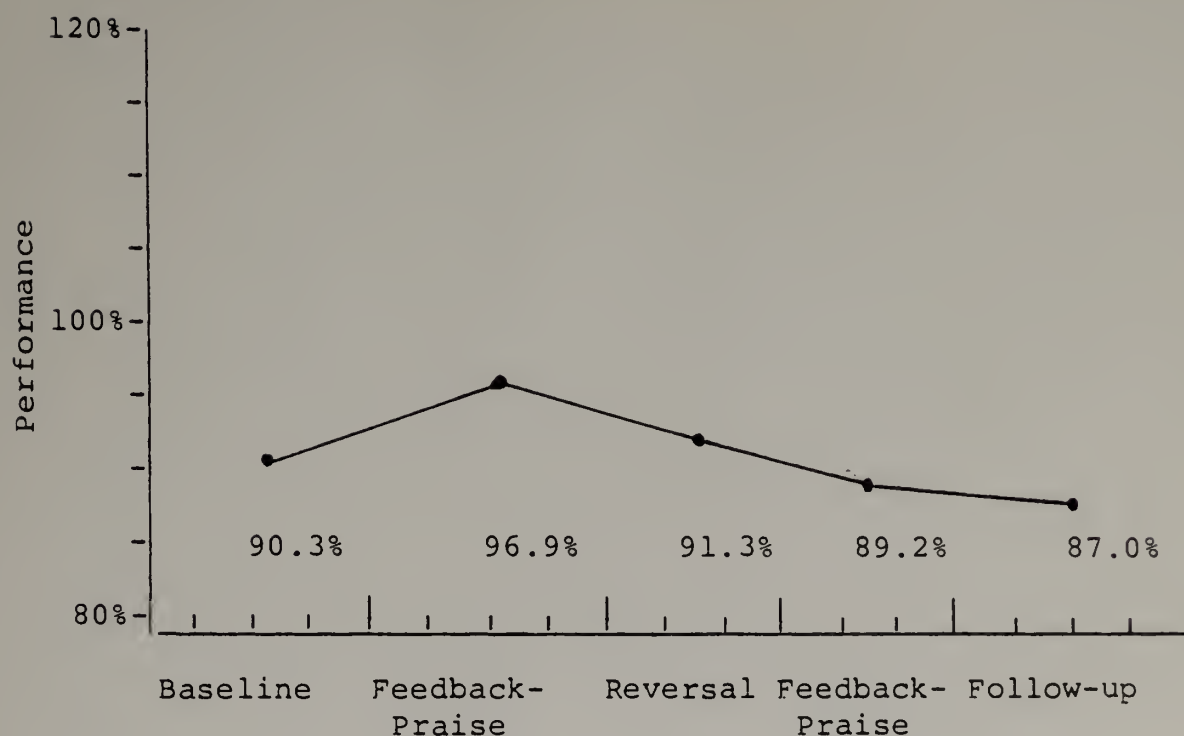
EMPLOYEE PERFORMANCE REPORTSubject No. 5

Job Classification

☒ Assembler☐ Punch Press Operator☐ Line up and Adjust OperatorTime with company 8

Position in salary range

Before July review 120%After July review 120%Age 56EEO Code: Black ☐ White ☒ Hispanic ☐

EMPLOYEE PERFORMANCE REPORTSubject No. 6

Job Classification

X Assembler

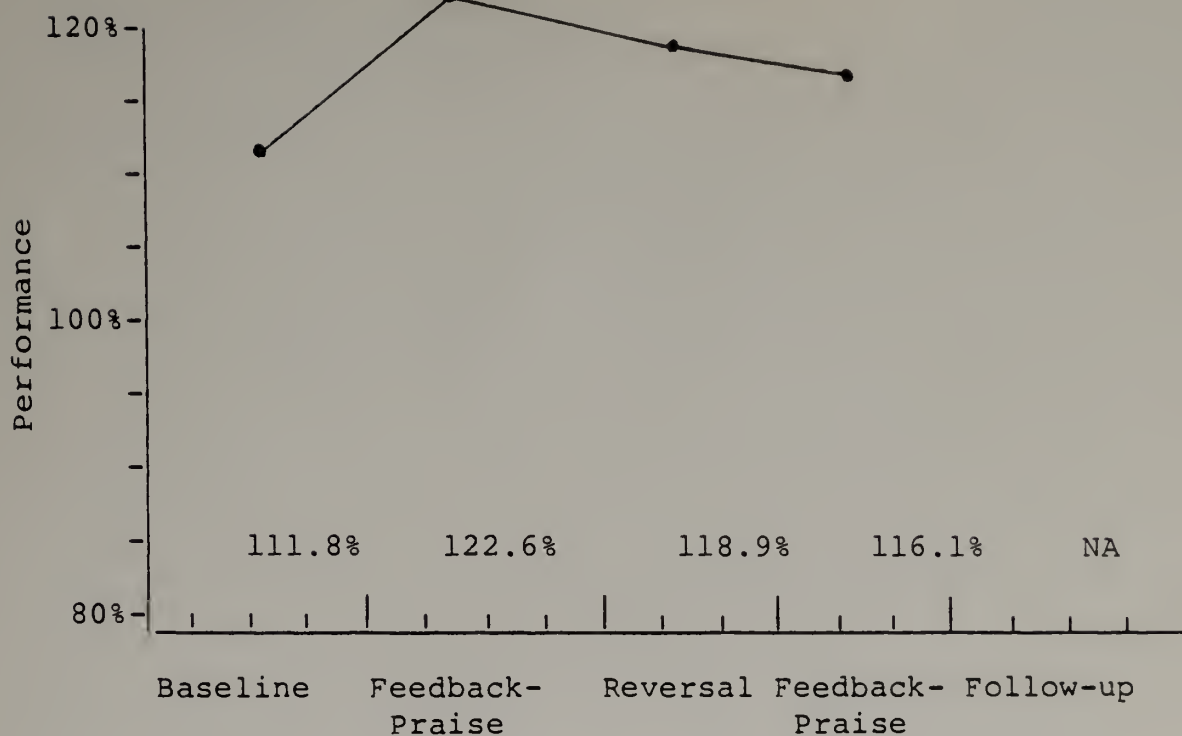
Punch Press Operator

Line up and Adjust Operator

Time with company < 1

Position in salary range

Before July review 104%After July review 104%Age 20EEO Code: Black White X Hispanic

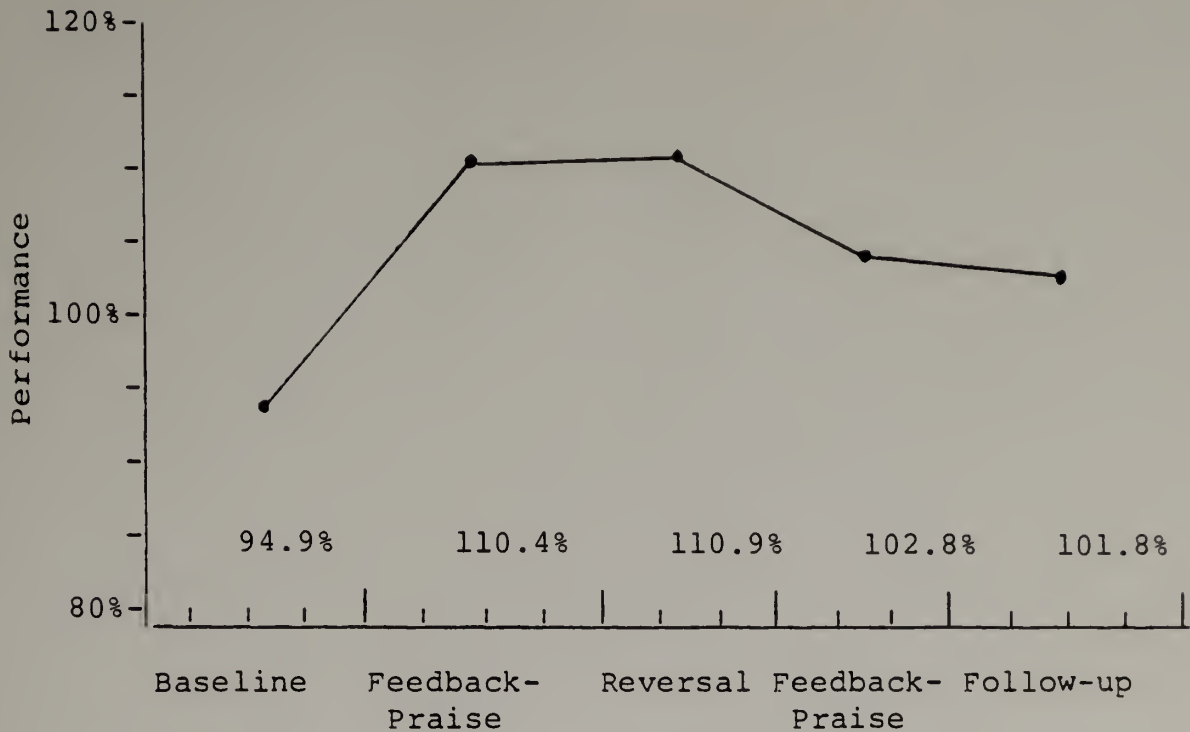
EMPLOYEE PERFORMANCE REPORTSubject No. 7

Job Classification

☒ Assembler☐ Punch Press Operator☐ Line up and Adjust OperatorTime with company <1

Position in salary range

Before July review 91After July review 95Age 30EEO Code: Black ☐ White ☐ Hispanic ☒

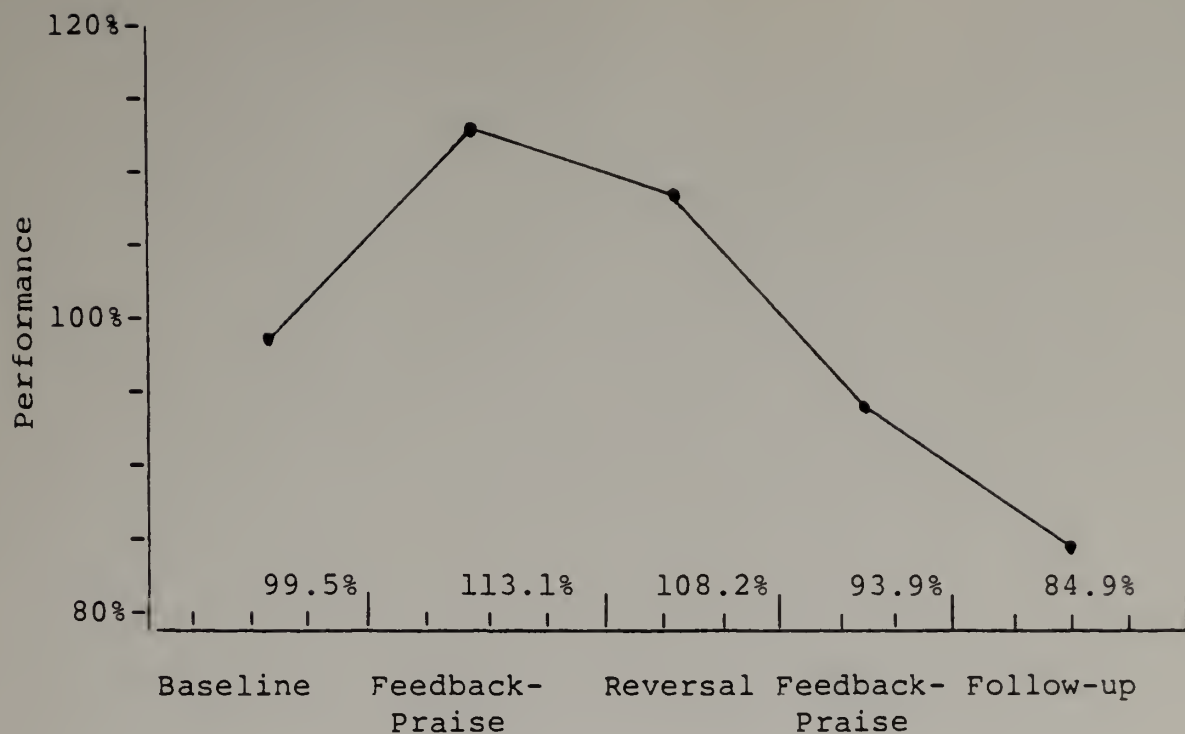
EMPLOYEE PERFORMANCE REPORTSubject No. 8

Job Classification

☒ Assembler☐ Punch Press Operator☐ Line up and Adjust OperatorTime with company <1

Position in salary range

Before July review 93%After July review 100%Age 50EEO Code: Black ☐ White ☒ Hispanic ☐

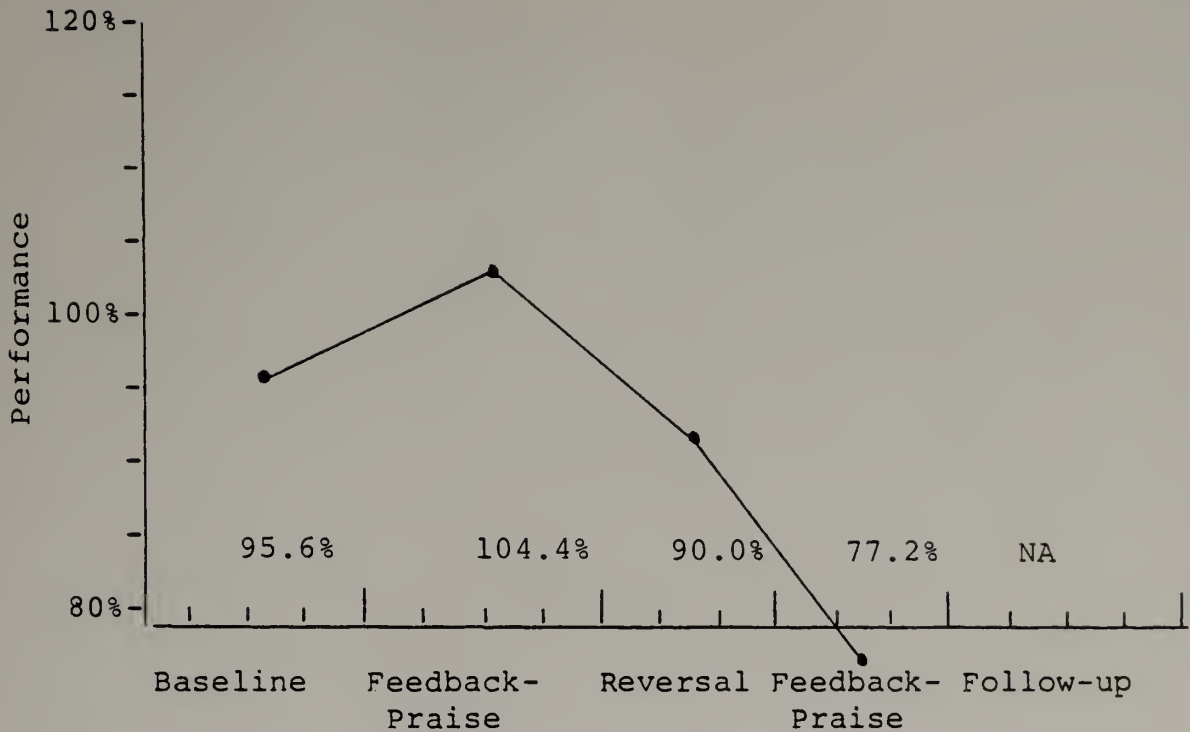
EMPLOYEE PERFORMANCE REPORTSubject No. 9

Job Classification

☒ Assembler☐ Punch Press Operator☐ Line up and Adjust OperatorTime with company 1

Position in salary range

Before July review 100%After July review 103%Age 55EEO Code: Black ☐ White ☐ Hispanic ☒

EMPLOYEE PERFORMANCE REPORTSubject No. 10

Job Classification

X Assembler

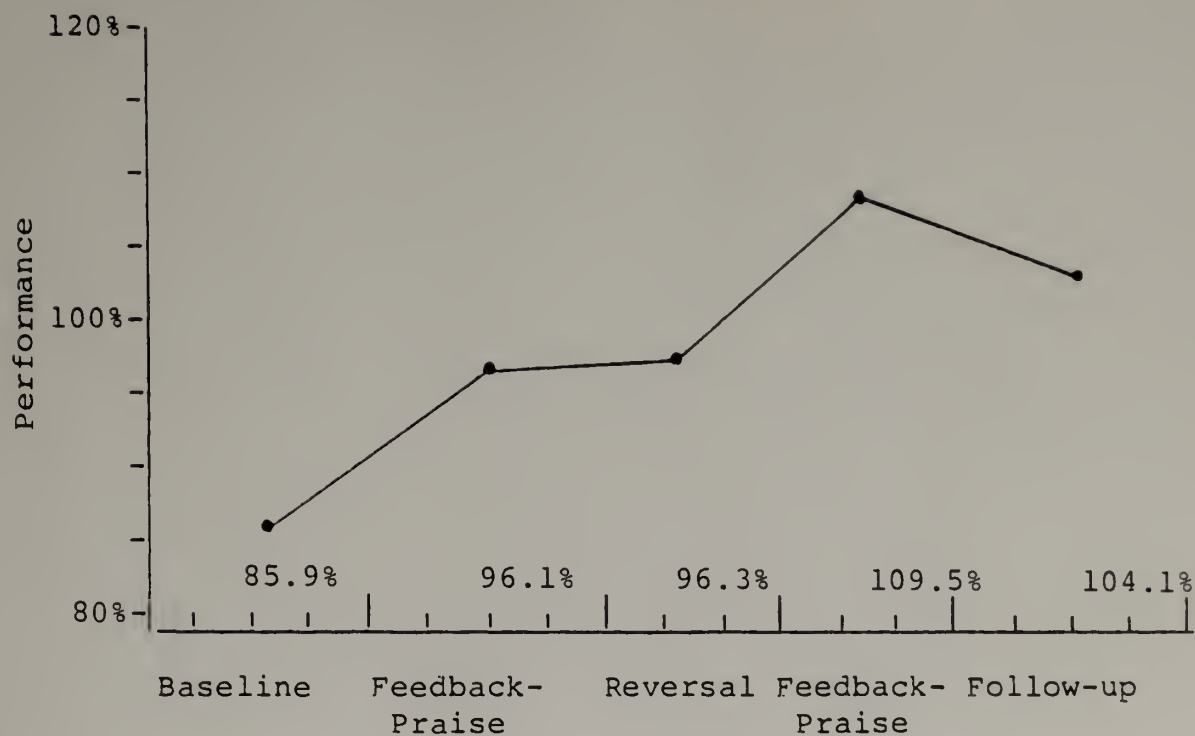
Punch Press Operator

Line up and Adjust Operator

Time with company 3

Position in salary range

Before July review 104%After July review 104%Age 32EEO Code: Black _____ White X Hispanic _____

EMPLOYEE PERFORMANCE REPORTSubject No. 11

Job Classification

X Assembler

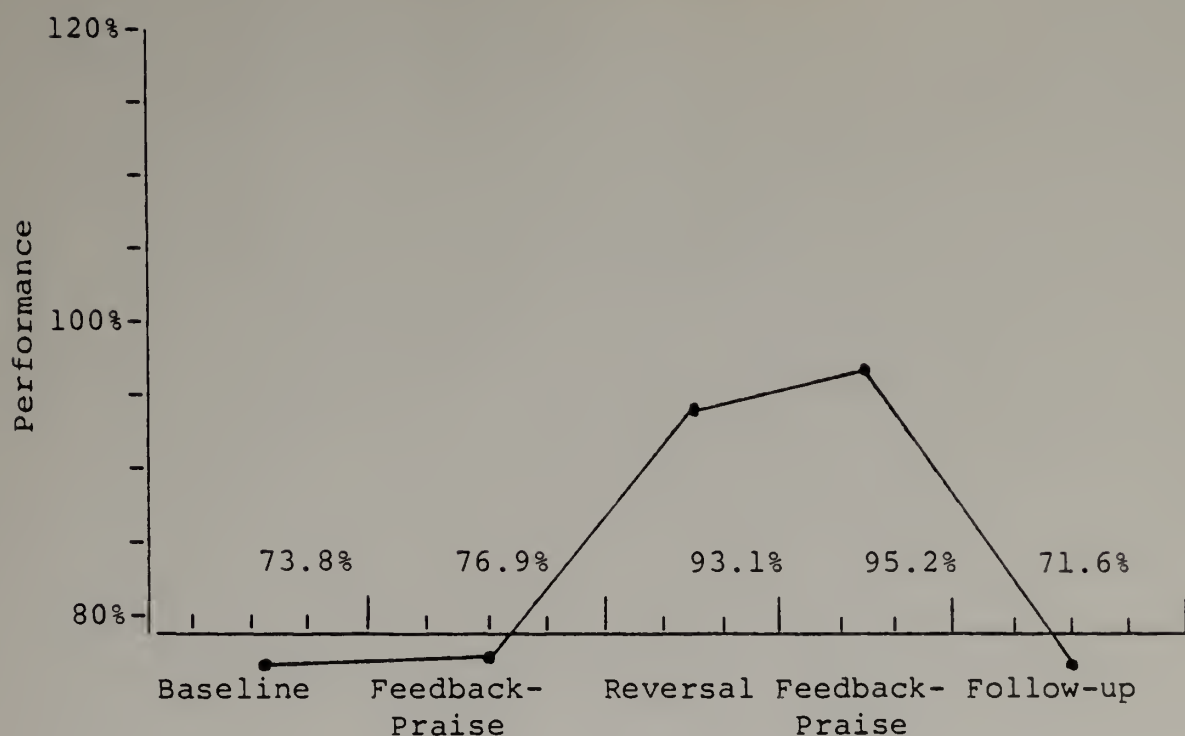
Punch Press Operator

Line up and Adjust Operator

Time with company 1

Position in salary range

Before July review 93%After July review 100%Age 25EEO Code: Black White x Hispanic

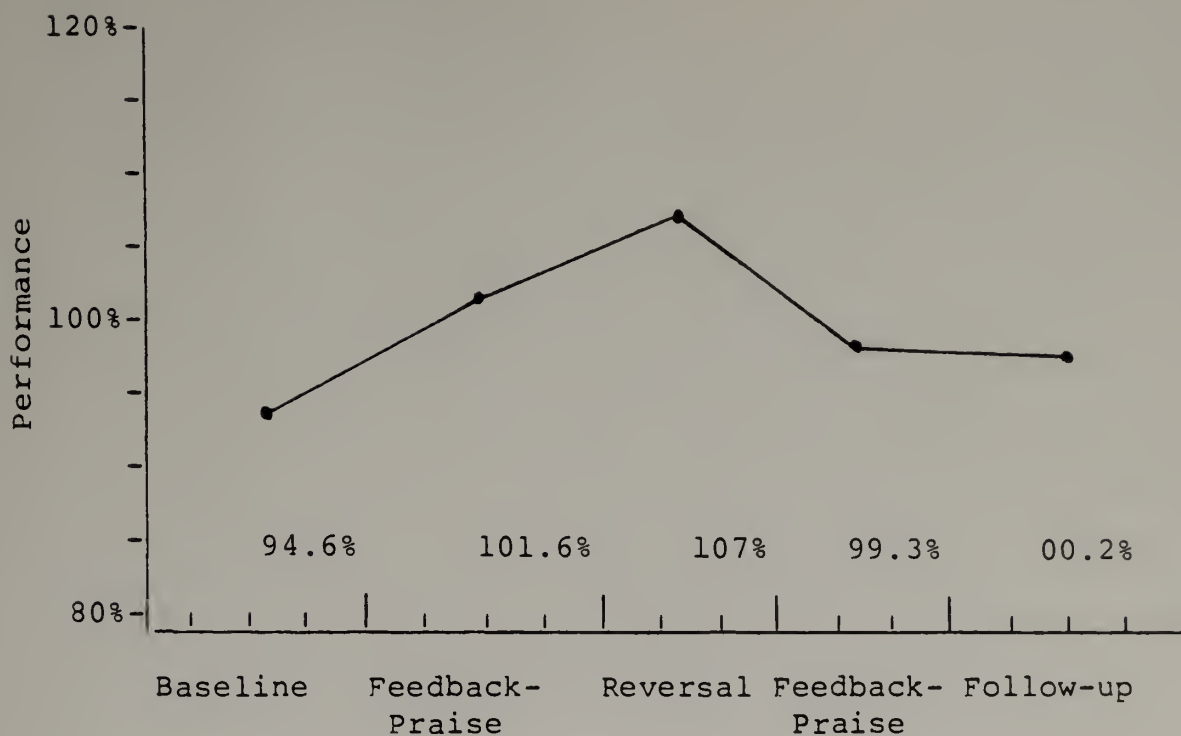
EMPLOYEE PERFORMANCE REPORTSubject No. 12

Job Classification

☒ Assembler☐ Punch Press Operator☐ Line up and Adjust OperatorTime with company <1

Position in salary range

Before July review 85%After July review 85%Age 18EEO Code: Black ☐ White ☒ Hispanic ☐

EMPLOYEE PERFORMANCE REPORTSubject No. 13

Job Classification

X Assembler

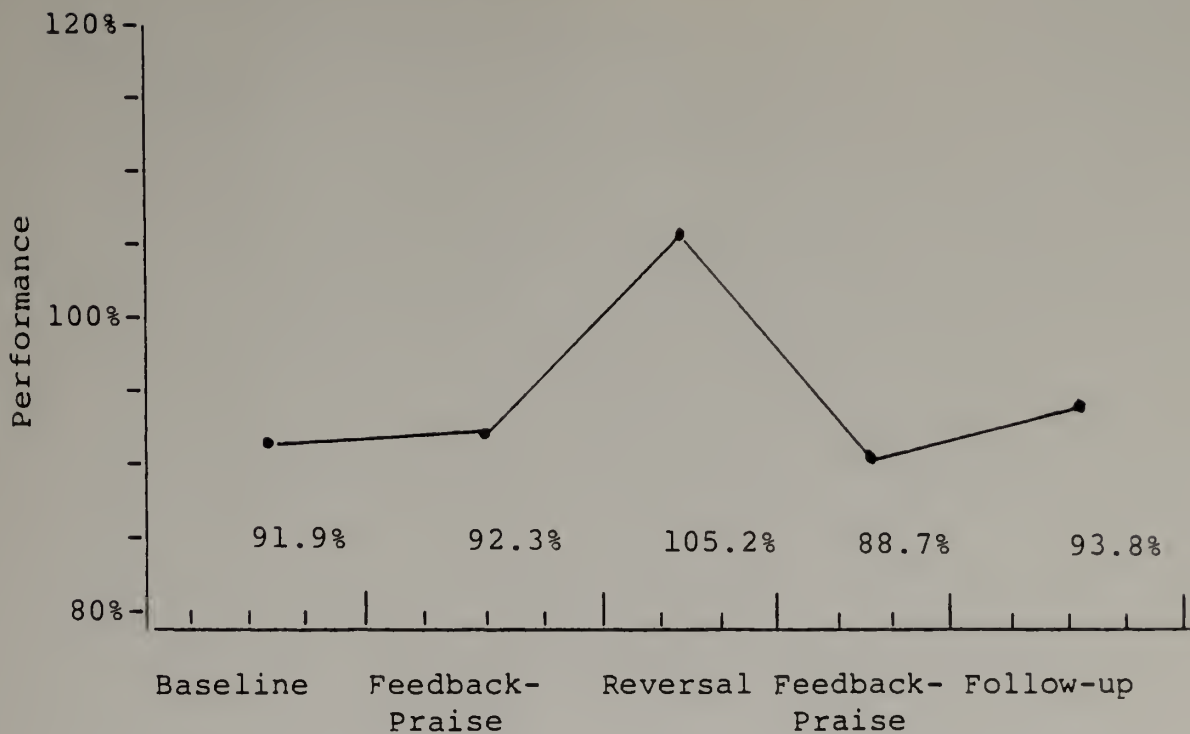
Punch Press Operator

Line up and Adjust Operator

Time with company -

Position in salary range

Before July review 104%After July review 104%Age 28EEO Code: Black White Hispanic x

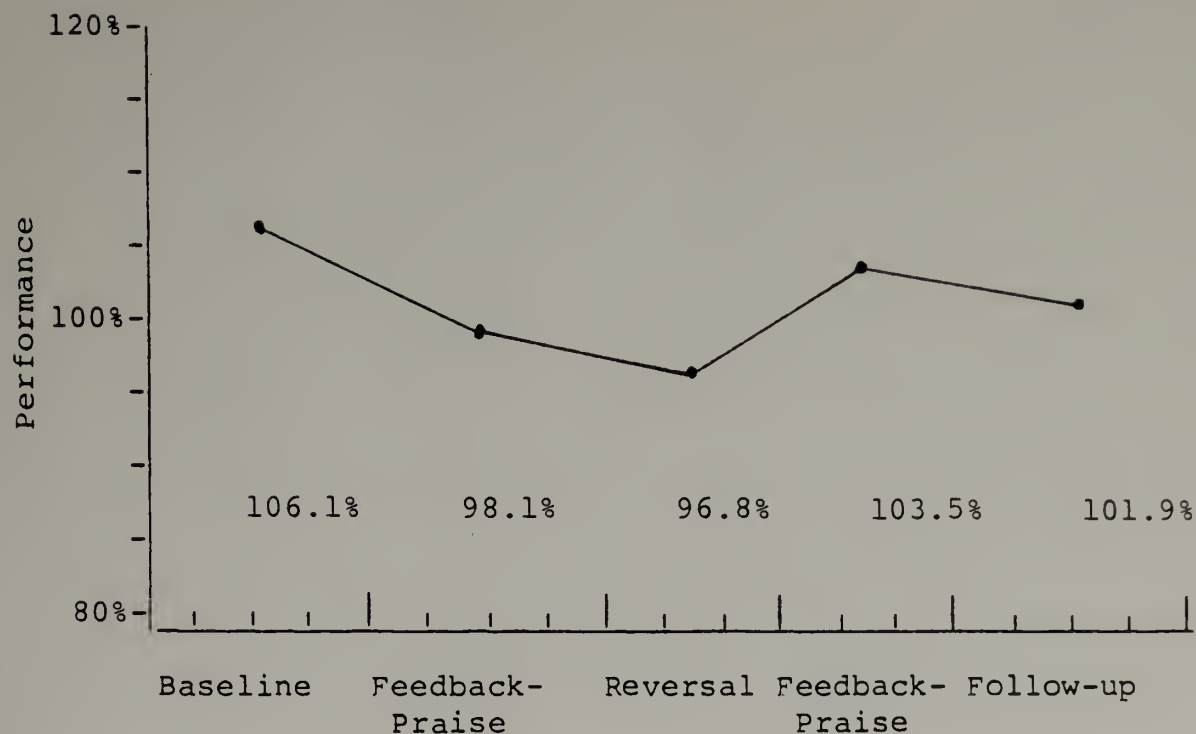
EMPLOYEE PERFORMANCE REPORTSubject No. 14

Job Classification

☒ Assembler☐ Punch Press Operator☐ Line up and Adjust OperatorTime with company 2

Position in salary range

Before July review 103%After July review 103%Age 43EEO Code: Black ☐ White ☒ Hispanic ☐

EMPLOYEE PERFORMANCE REPORTSubject No. 15

Job Classification

X Assembler

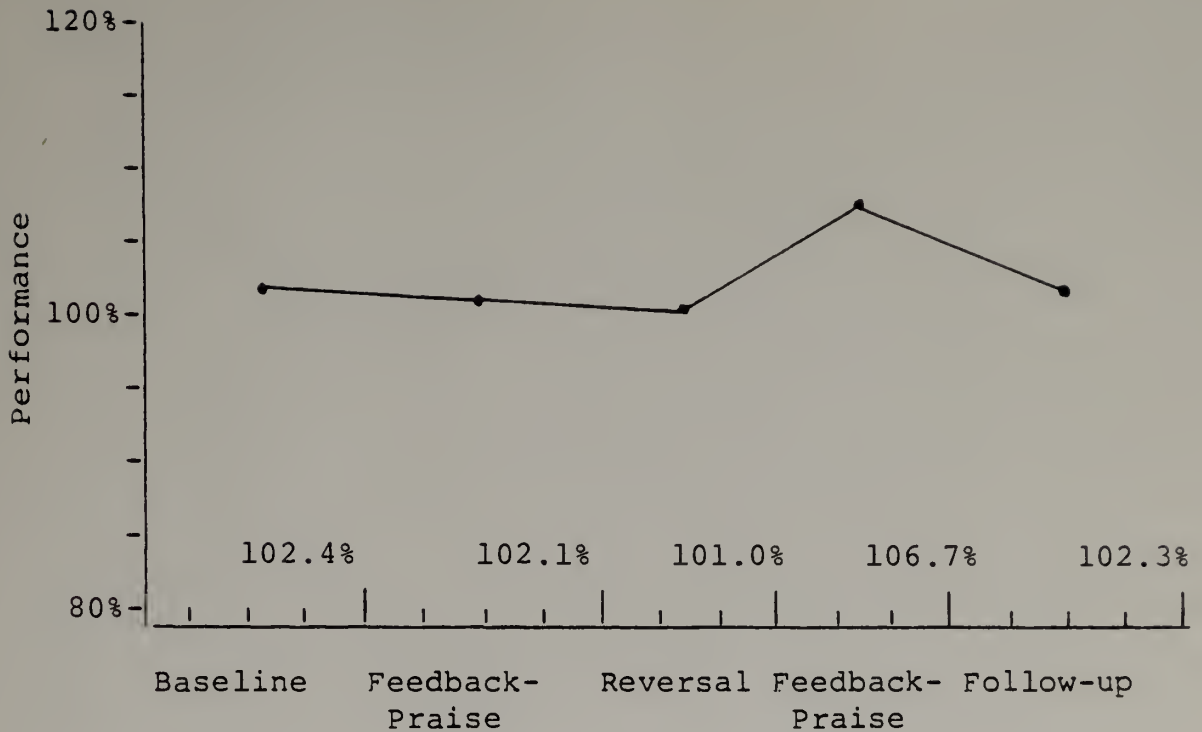
Punch Press Operator

Line up and Adjust Operator

Time with company 28 (8 in dept.)

Position in salary range

Before July review 139%After July review 139%Age 57EEO Code: Black White X Hispanic

EMPLOYEE PERFORMANCE REPORTSubject No. 16

Job Classification

X Assembler

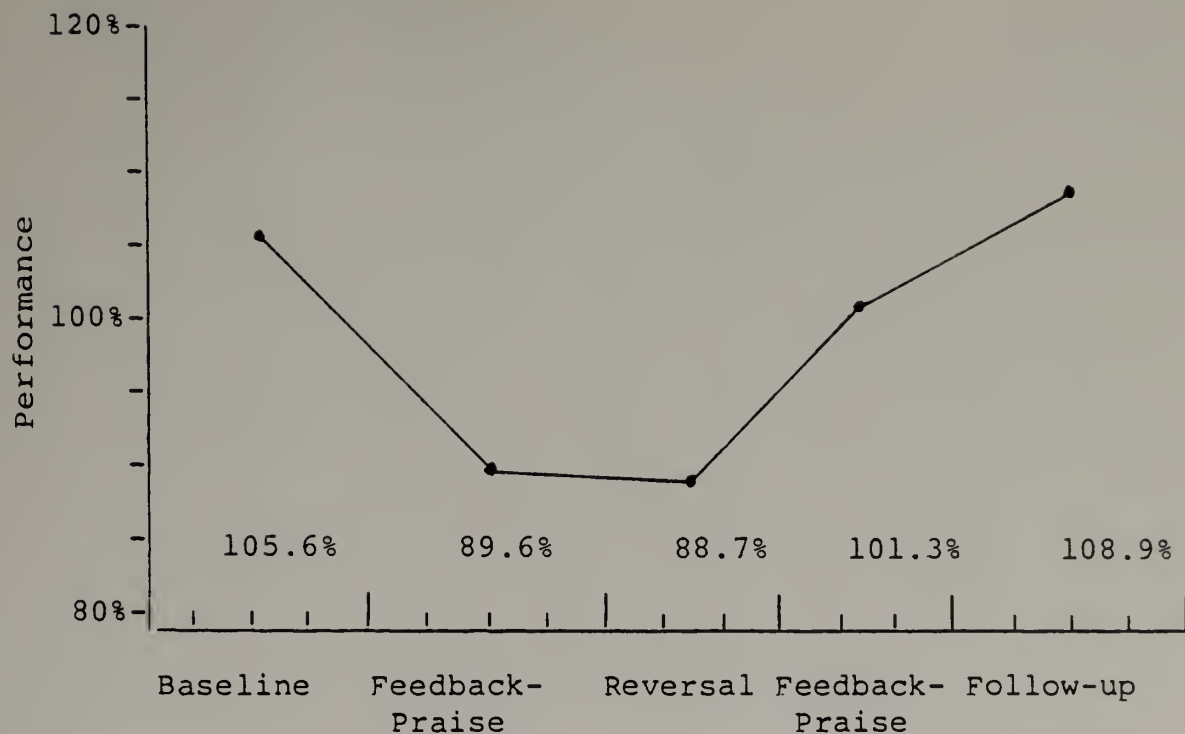
Punch Press Operator

Line up and Adjust Operator

Time with company 30 (8 in Dept.)

Position in salary range

Before July review 143%After July review 143%Age 64EEO Code: Black _____ White X Hispanic _____

EMPLOYEE PERFORMANCE REPORTSubject No. 17

Job Classification

X Assembler

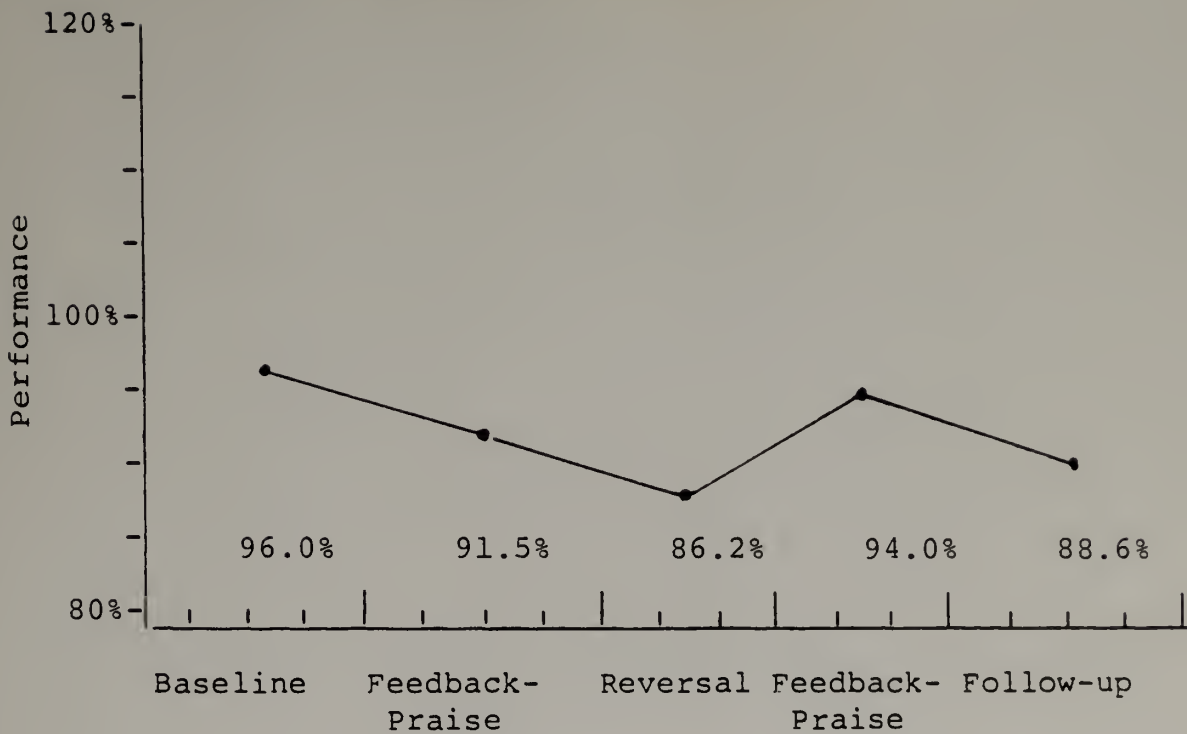
Punch Press Operator

Line up and Adjust Operator

Time with company 1

Position in salary range

Before July review 93%After July review 100%Age 31EEO Code: Black White X Hispanic

EMPLOYEE PERFORMANCE REPORTSubject No. 18

Job Classification

X Assembler

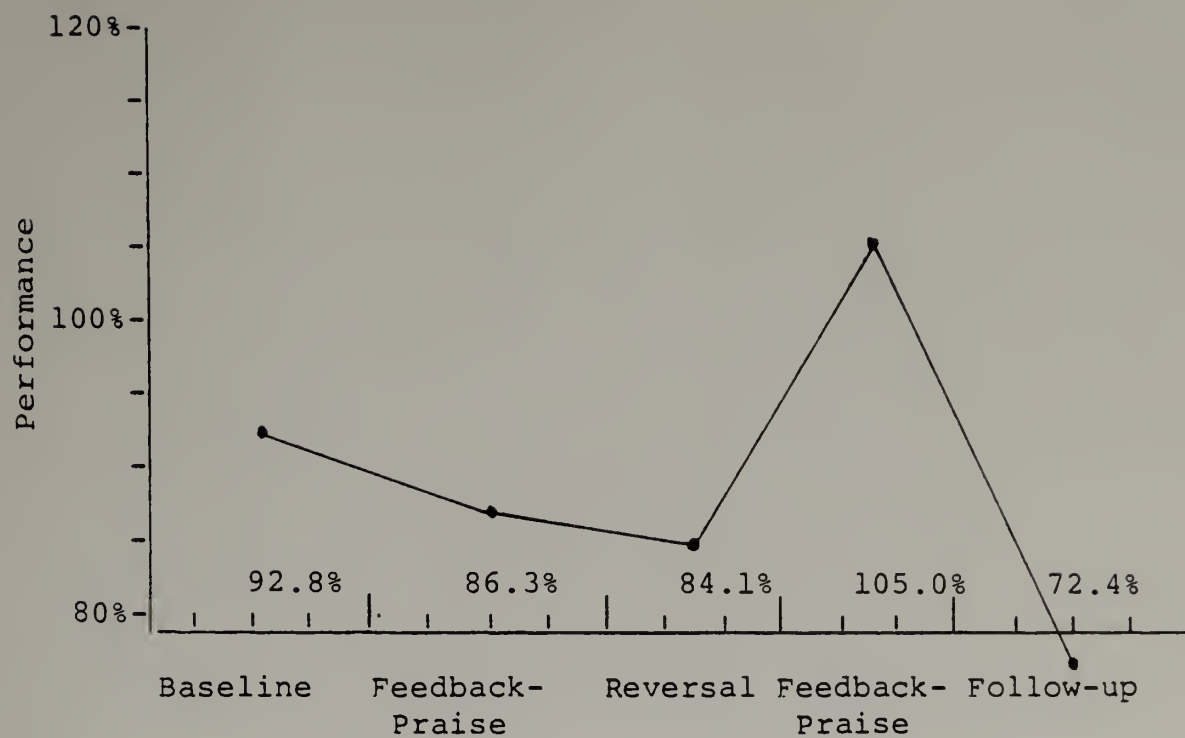
Punch Press Operator

Line up and Adjust Operator

Time with company 2

Position in salary range

Before July review 109%After July review 114%Age 49EEO Code: Black White X Hispanic

EMPLOYEE PERFORMANCE REPORTSubject No. 19

Job Classification

X Assembler

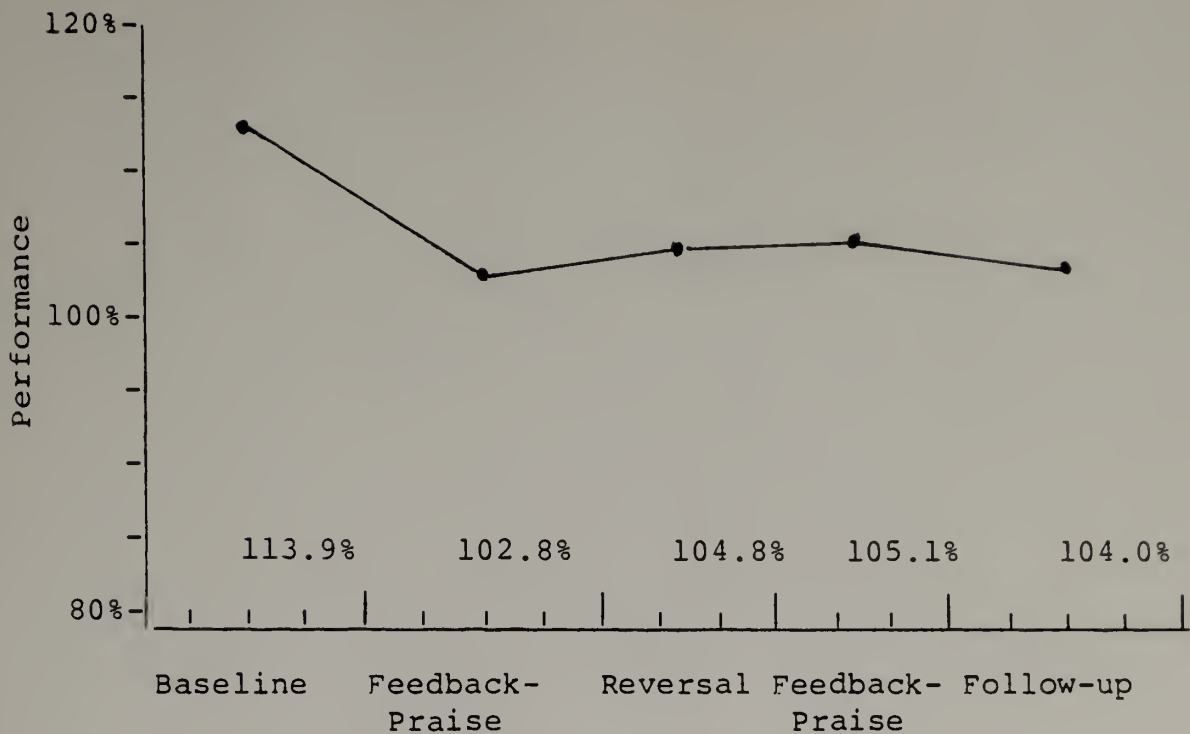
Punch Press Operator

Line up and Adjust Operator

Time with company <1

Position in salary range

Before July review 100%After July review 100%Age 37EEO Code: Black White X Hispanic

EMPLOYEE PERFORMANCE REPORTSubject No. 20

Job Classification

X Assembler

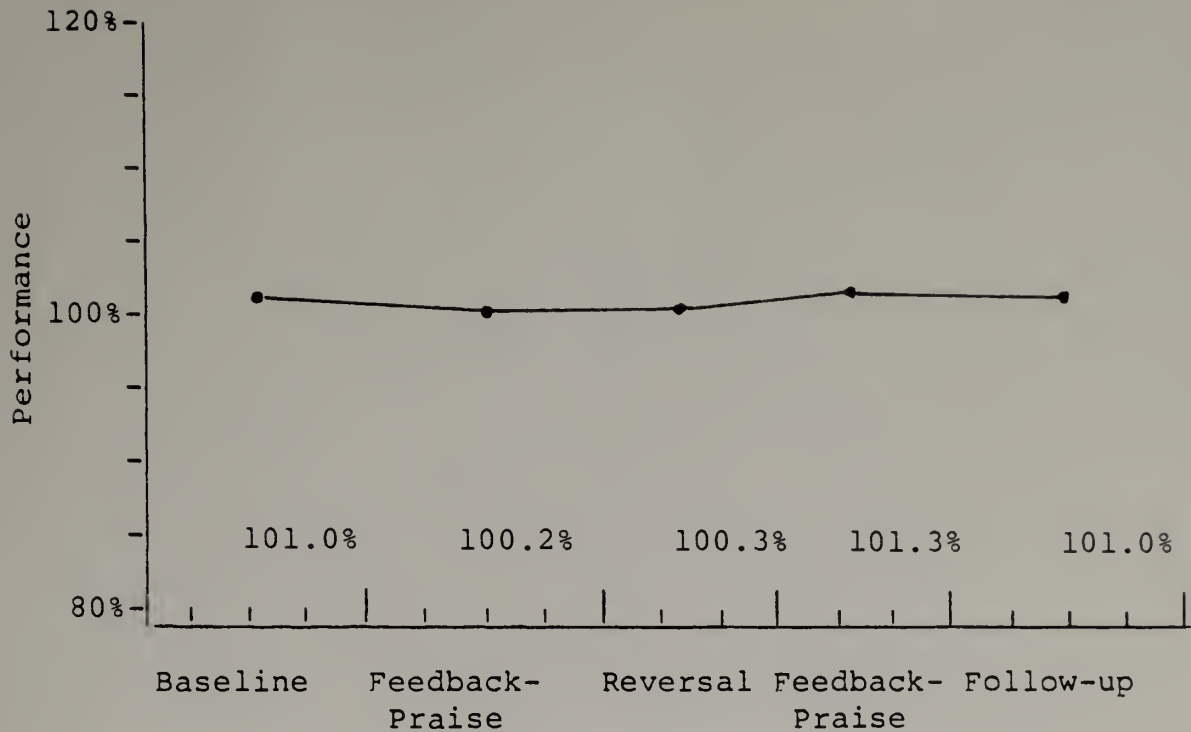
Punch Press Operator

Line up and Adjust Operator

Time with company 23 (7 in Dept.)

Position in salary range

Before July review 174%After July review 174%Age 57EEO Code: Black White x Hispanic

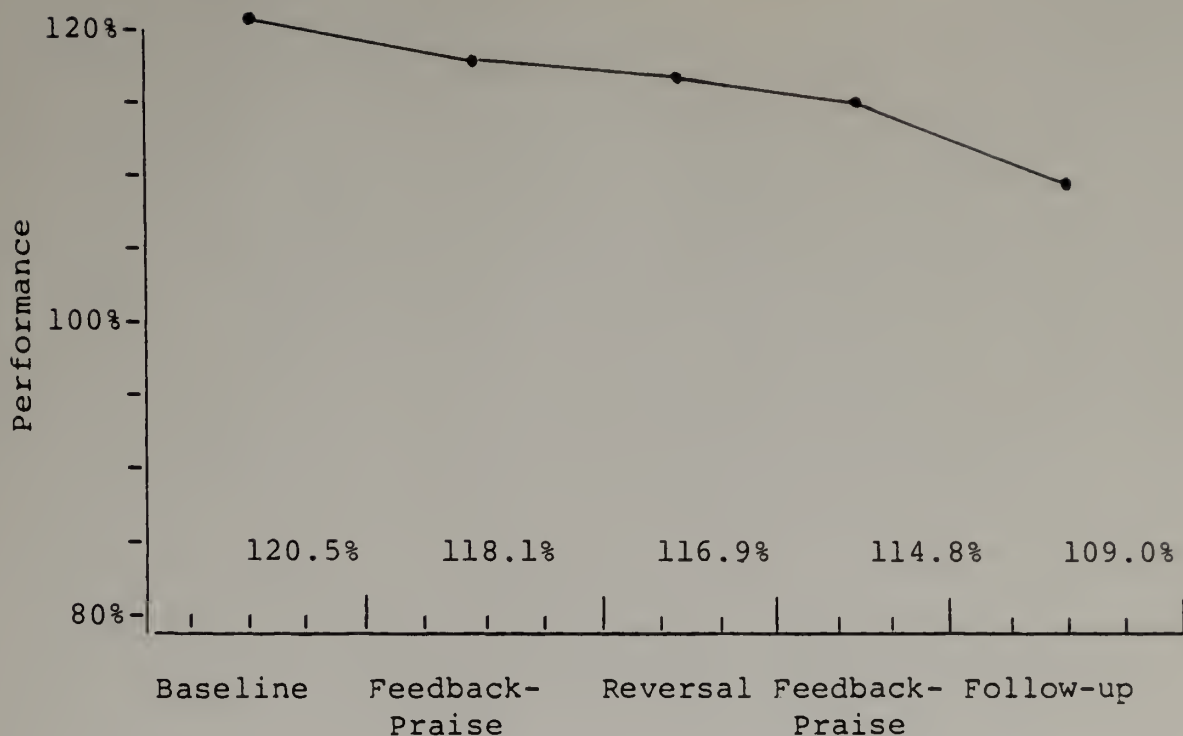
EMPLOYEE PERFORMANCE REPORTSubject No. 21

Job Classification

☒ Assembler☐ Punch Press Operator☐ Line up and Adjust OperatorTime with company 13 (8 with Dept.)

Position in salary range

Before July review 125%After July review 125%Age 31EEO Code: Black ☐ White ☒ Hispanic ☐

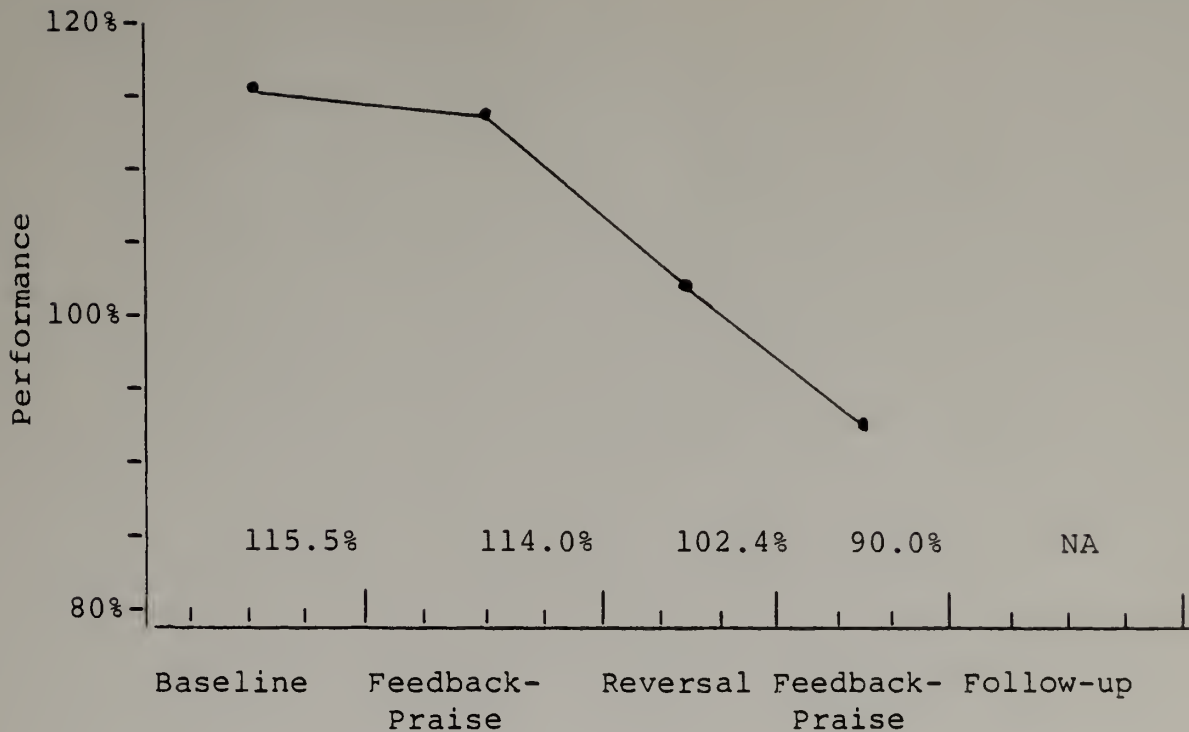
EMPLOYEE PERFORMANCE REPORTSubject No. 22

Job Classification

☒ Assembler☐ Punch Press Operator☐ Line up and Adjust OperatorTime with company <1

Position in salary range

Before July review 100%After July review 100%Age 54EEO Code: Black ☐ White ☒ Hispanic ☐

EMPLOYEE PERFORMANCE REPORTSubject No. 23

Job Classification

X Assembler

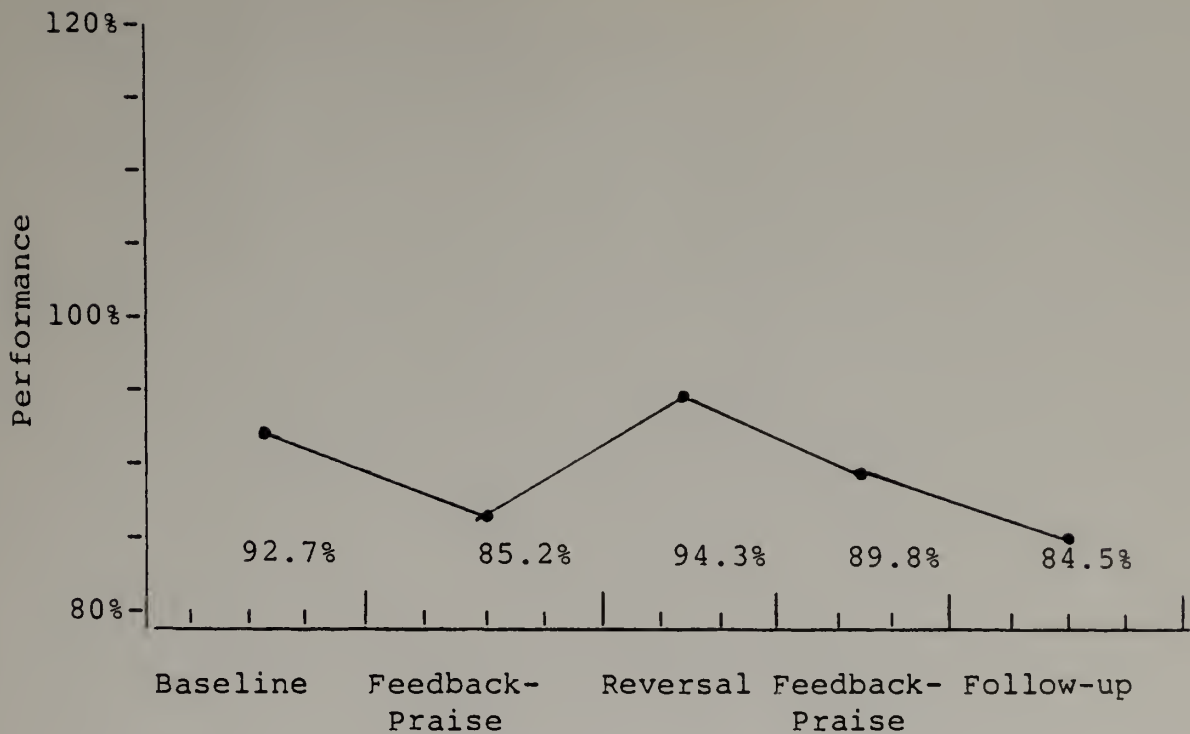
Punch Press Operator

Line up and Adjust Operator

Time with company 24 (1 with dept.)

Position in salary range

Before July review 100%After July review 100%Age 42EEO Code: Black _____ White x Hispanic _____

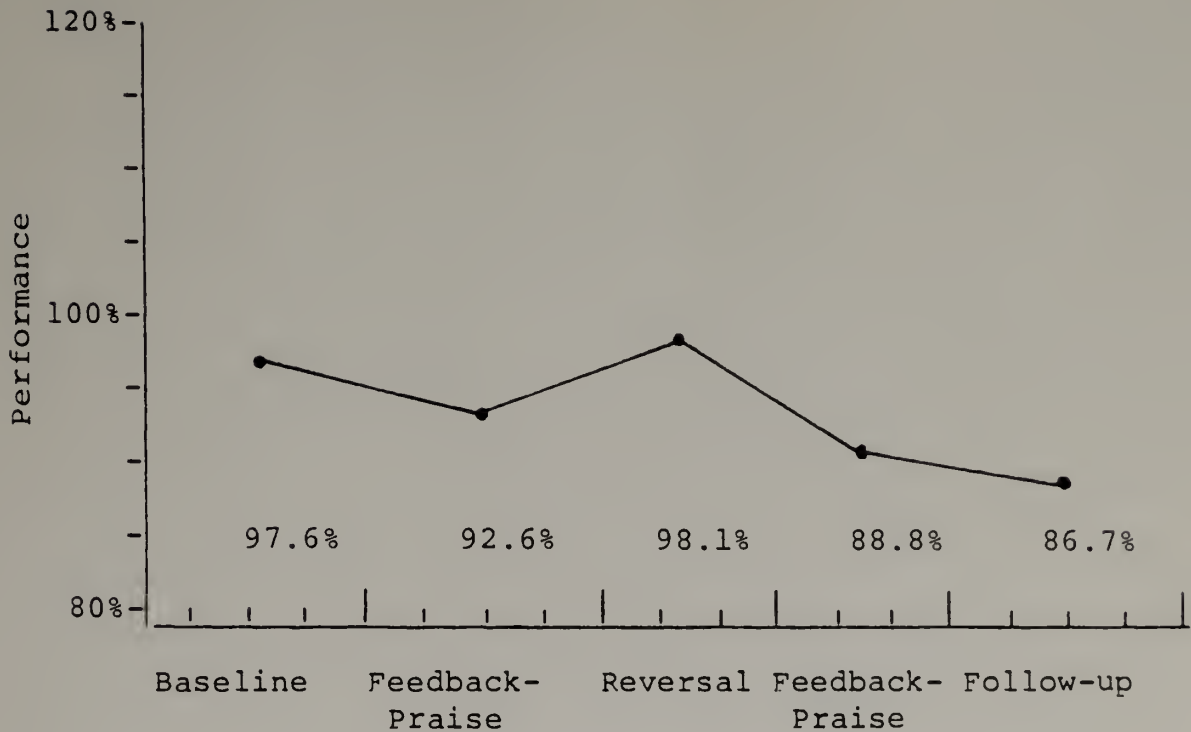
EMPLOYEE PERFORMANCE REPORTSubject No. 24

Job Classification

☒ Assembler☐ Punch Press Operator☐ Line up and Adjust OperatorTime with company 23

Position in salary range

Before July review 142%After July review 142%Age 58EEO Code: Black ☐ White ☒ Hispanic ☐

EMPLOYEE PERFORMANCE REPORTSubject No. 25

Job Classification

X Assembler

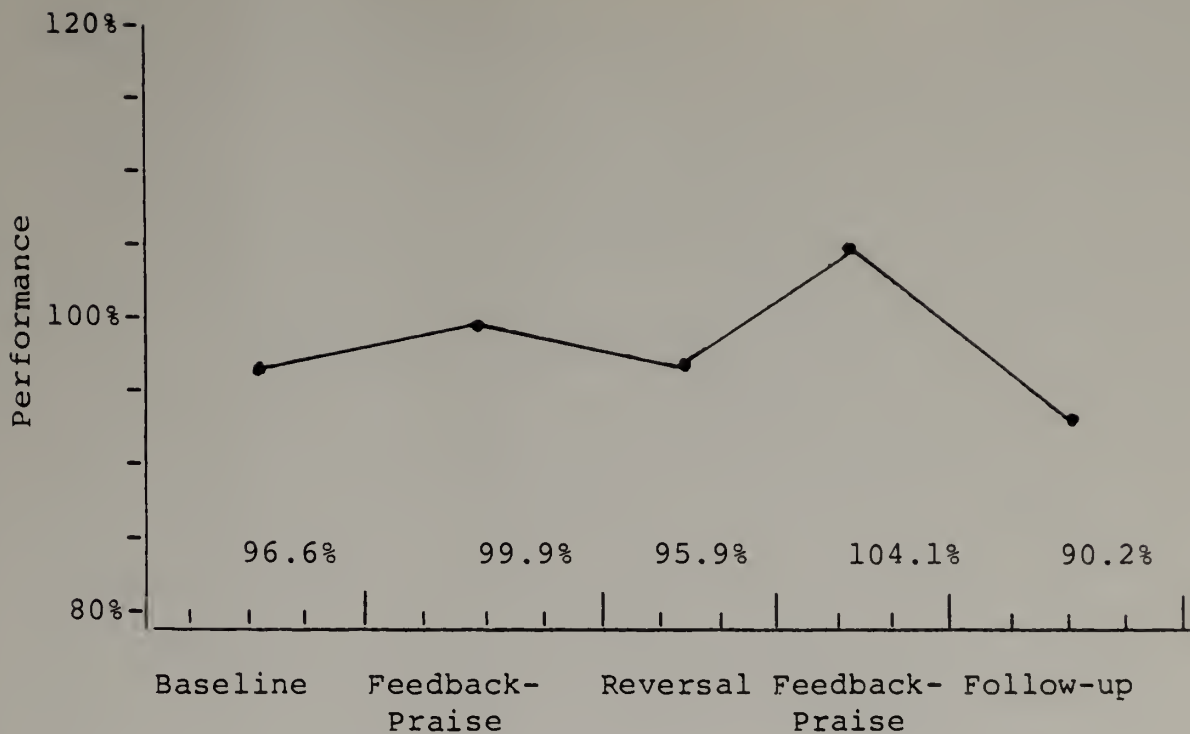
Punch Press Operator

Line up and Adjust Operator

Time with company 13 (5 with dept.)

Position in salary range

Before July review 117%After July review 117%Age 60EEO Code: Black White X Hispanic

EMPLOYEE PERFORMANCE REPORTSubject No. 26

Job Classification

Assembler

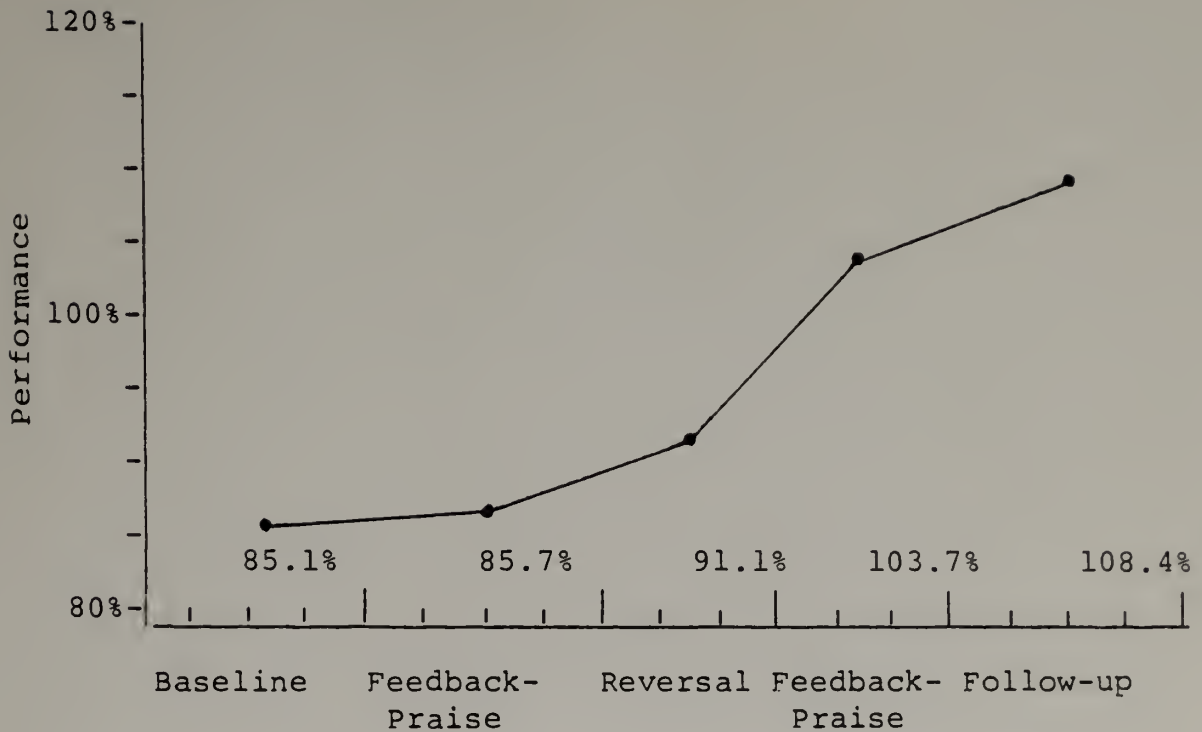
☒ Punch Press Operator

Line up and Adjust Operator

Time with company 8

Position in salary range

Before July review 109%After July review 109%Age 43EEO Code: Black ☒ White ☐ Hispanic ☐

EMPLOYEE PERFORMANCE REPORTSubject No. 27

Job Classification

Assembler

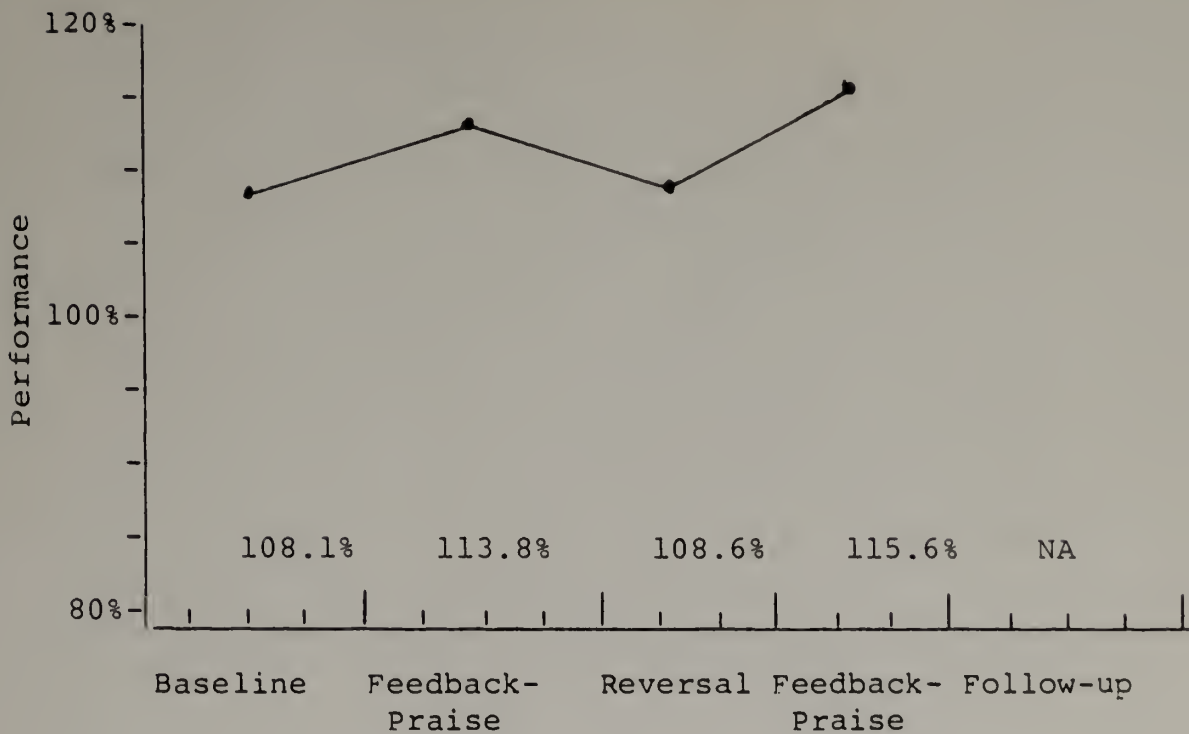
X Punch Press Operator

Line up and Adjust Operator

Time with company 41

Position in salary range

Before July review 92%After July review 100%Age 28EEO Code: Black _____ White X Hispanic _____

EMPLOYEE PERFORMANCE REPORTSubject No. 28

Job Classification

Assembler

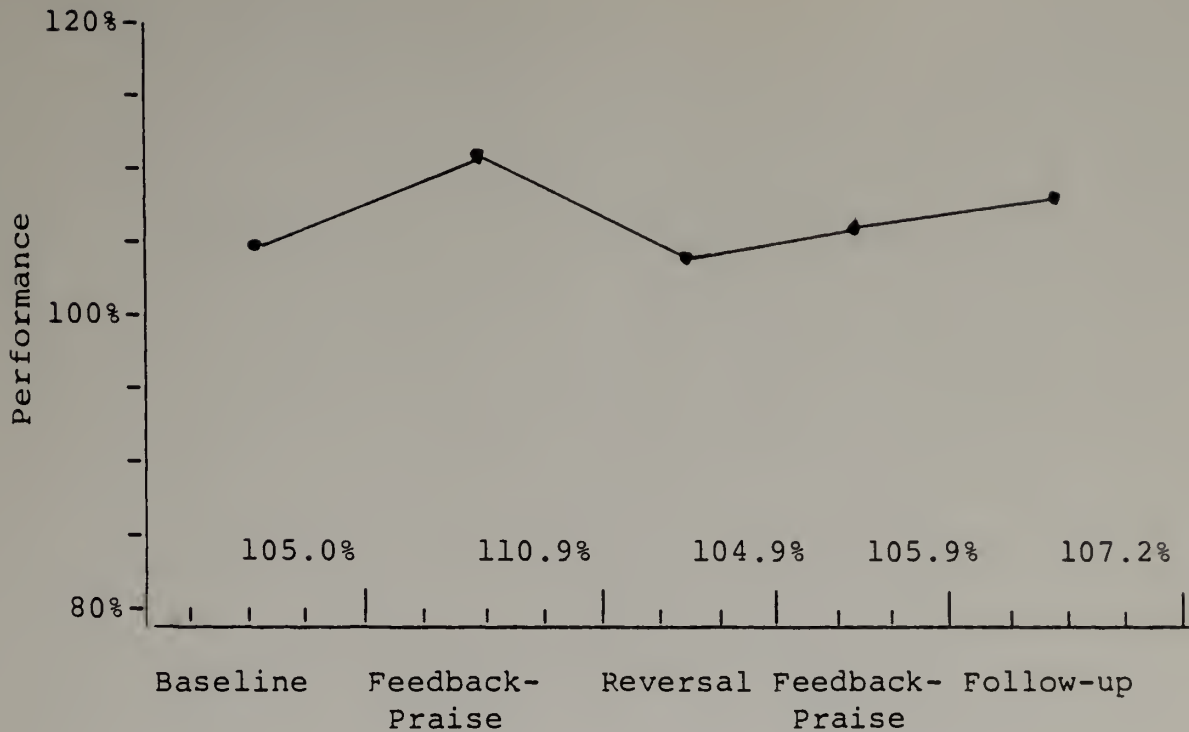
X Punch Press Operator

Line up and Adjust Operator

Time with company 2

Position in salary range

Before July review 104%After July review 106%Age 44EEO Code: Black White X Hispanic

EMPLOYEE PERFORMANCE REPORTSubject No. 29

Job Classification

Assembler

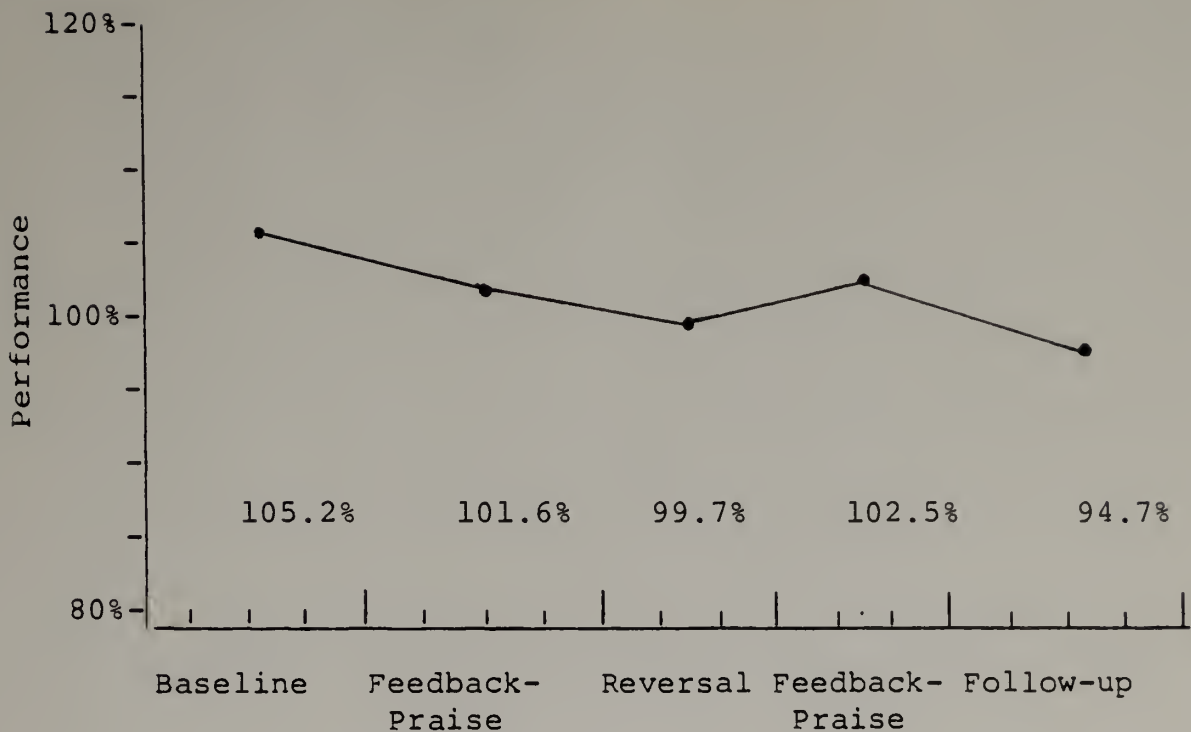
X Punch Press Operator

Line up and Adjust Operator

Time with company 12 *8 with dept.)

Position in salary range

Before July review 116%After July review 116%Age 56EEO Code: Black White X Hispanic

EMPLOYEE PERFORMANCE REPORTSubject No. 30

Job Classification

Assembler

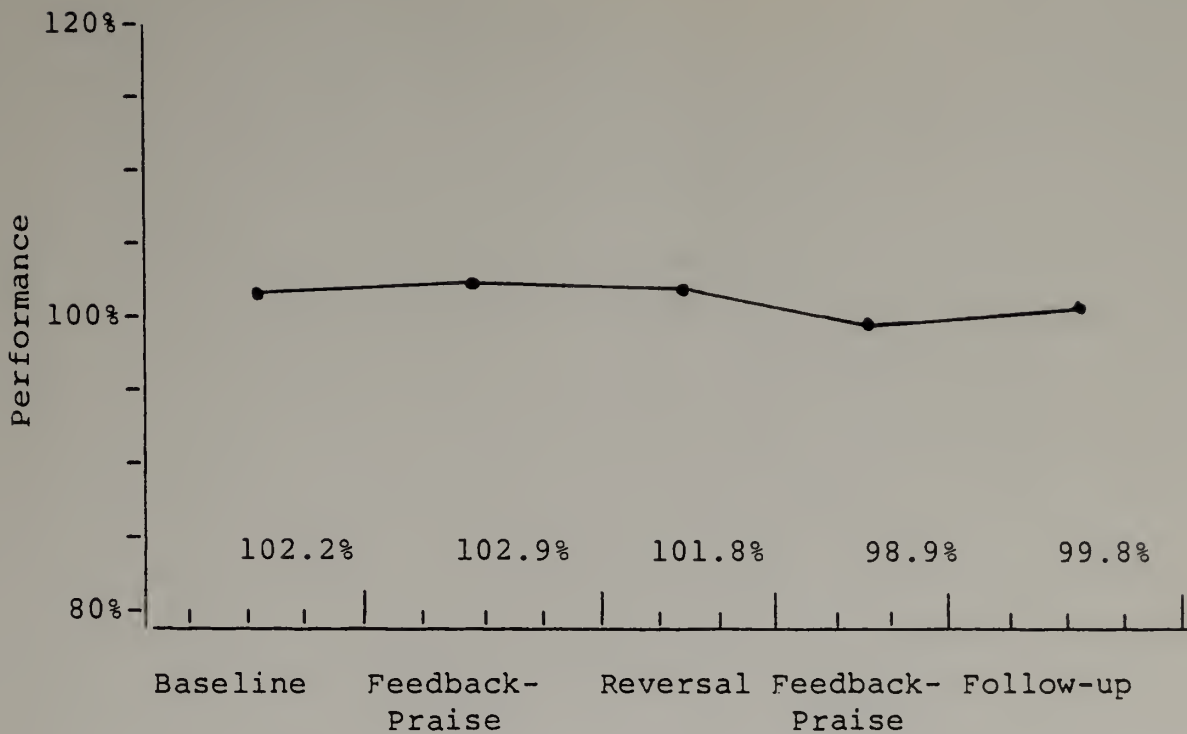
X Punch Press Operator

Line up and Adjust Operator

Time with company 28 (8 with dept.)

Position in salary range

Before July review 125%After July review 125%Age 56EEO Code: Black White X Hispanic

EMPLOYEE PERFORMANCE REPORTSubject No. 31

Job Classification

Assembler

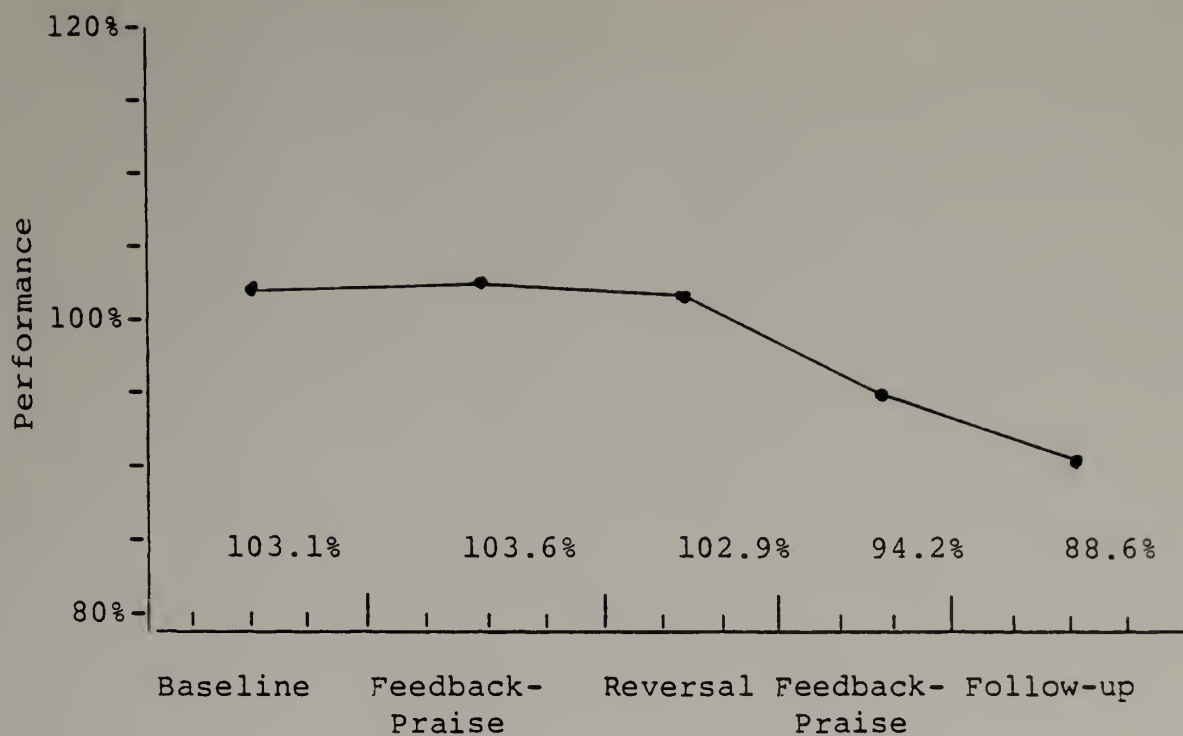
Punch Press Operator

X Line up and Adjust Operator

Time with company 28 (8 in dept.)

Position in salary range

Before July review 125%After July review 125%Age 49EEO Code: Black _____ White X Hispanic _____

EMPLOYEE PERFORMANCE REPORTSubject No. 32

Job Classification

Assembler

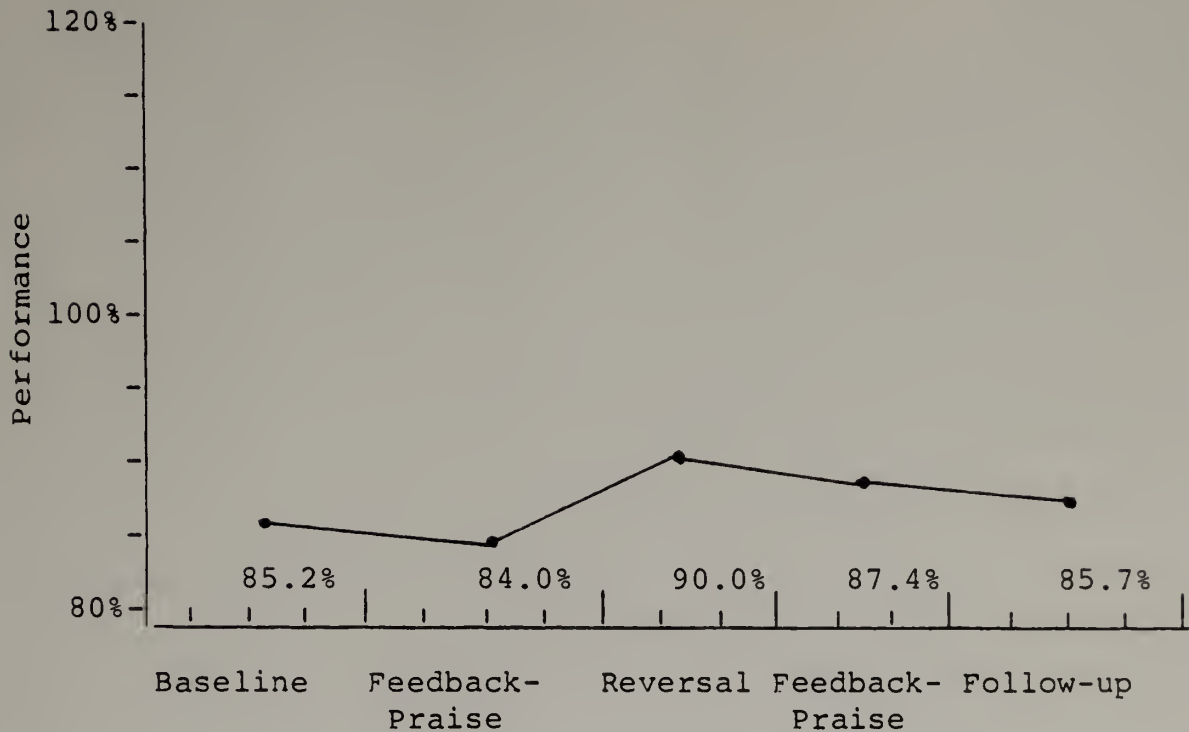
Punch Press Operator

X Line up and Adjust Operator

Time with company 29 (8 with dept.)

Position in salary range

Before July review 135%After July review 135%Age 51EEO Code: Black White X Hispanic

EMPLOYEE PERFORMANCE REPORTSubject No. 33

Job Classification

Assembler

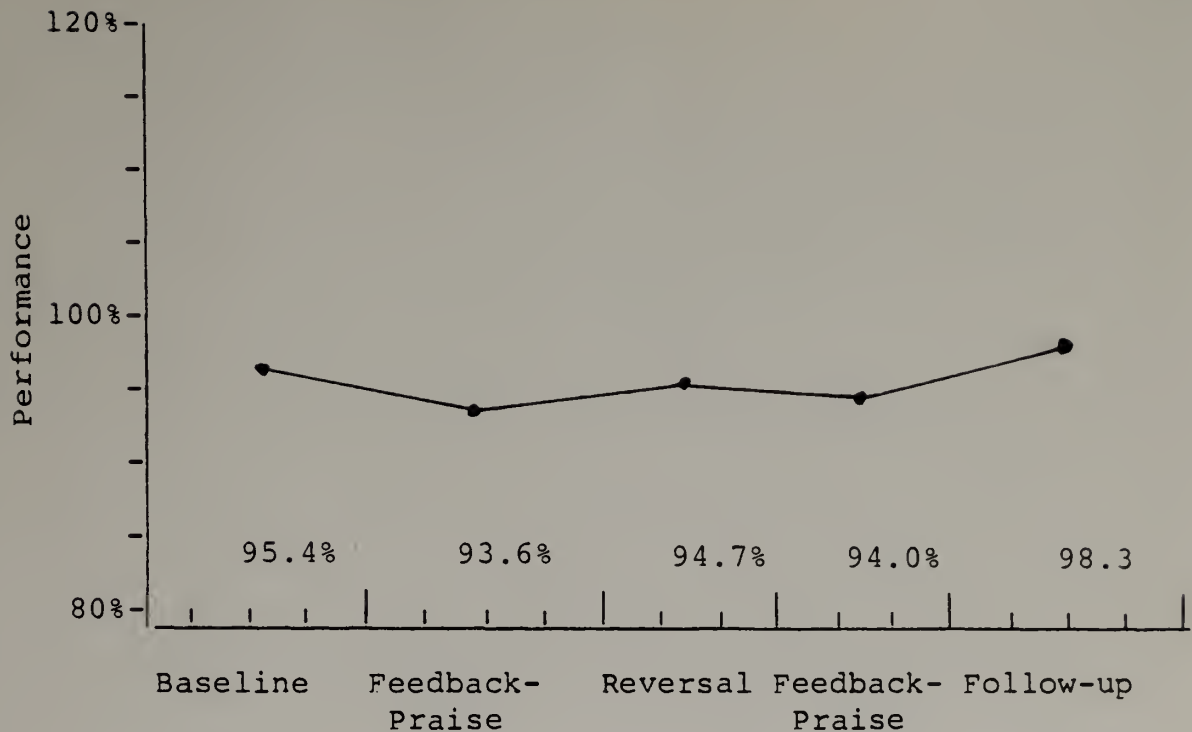
Punch Press Operator

X Line up and Adjust Operator

Time with company 26 (8 with dept.)

Position in salary range

Before July review 157%After July review 157%Age 62EEO Code: Black White Hispanic

EMPLOYEE PERFORMANCE REPORTSubject No. 34

Job Classification

Assembler

Punch Press Operator

☒ Line up and Adjust OperatorTime with company 10 (7 with dept.)

Position in salary range

Before July review 114%After July review 114%Age 47EEO Code: Black ☒ White ☐ Hispanic ☐

