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## A Comparison of the Relative Success of Two Pay Incentive Plans Under Controlled Conditions

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A Comparison of the Relative Success  
of Two Pay Incentive Plans  
Under Controlled Conditions

BY

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B.A., Winthrop College, 1979

THESIS

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## Introduction

Piece-rate wages have been in existence since 604 B.C., when Babylonian women were paid with food; the amount of food they received was dependent upon the amount of cloth they could weave (Alford, cited in Shapiro, 1978). During the 1500's, while the fleet called the "Arsenal of Venice" was being constructed, many progressive labor concepts were implemented to ensure the highest quality and the highest productivity of shipbuilders. Among these concepts was the use of a piece-rate incentive system (Lane, cited in Shapiro, 1978). During the English industrial revolution, it was common knowledge that an individual working in a piece-rate incentive situation was likely to produce more than one working for a daily or weekly wage (George, 1972). It is not a recent discovery that a piece-rate incentive plan, as a means of administering wages, can motivate workers to produce more than can wages paid on an hourly basis. Many studies and authors have provided evidence to this fact (e.g., Lawler, 1971; McManis & Dick, 1973; Pritchard, Dunnette, & Jorgenson, 1972; Rothe, 1946; Schneider & Olson, 1970; Schwab, 1973; Shapiro, 1978). Furthermore, managers and scientists have actively sought to improve the effectiveness of piece-rate

incentive plans through various methods. One of the primary ways has been to manipulate the amount of money received for each unit produced. Other methods include establishing scientific techniques on which to base rates, as well as developing various types of piece-rate incentive plans, such as differential piece-rate plans, multiple piece-rate plans and task and premium bonus systems (Lawler, 1971).

Although research indicates that piece-rate incentive plans will generally increase production, research has also evidenced side effects that serve to limit the effectiveness of piece-rate incentive plans (Lawler, 1971). The side effect that has received the greatest amount of attention is the presence of norms that serve to restrict production. Mathewson (cited in Lawler, 1971) concluded that workers on a piece-rate plan in a machine shop produced only 50 percent of what they were capable of producing. Parsons (1974) reported that regardless of management's efforts to improve the effectiveness of the incentive system, workers in the Bank Wiring Room Study at Hawthorne maintained a steady production rate. Both Parsons and Mathewson stated that group norms were present that served to restrict production beyond an acceptable rate. Each worker, in both situations, was careful not to exceed the limit. Conformity to the norms which served to



restrict production was ensured by threats of social ostracism, degradation, and even physical punishment. Workers in both studies reported that fear of the lowering of the rates, reduction of hours and loss of jobs were their reasons for restricting production.

Whyte (1955) compiled a detailed analysis of incentive systems and their implications in industry. Although 10 years earlier Rothe (1946) had concluded that production was a function of the magnitude of incentives available to workers, Whyte realized other implications of incentive systems and their effects on production. Whyte understood the group pressure to conform to norms that restricted production. He stated that the worker responds not only to the monetary reward offered by the incentive plan, but also to the total factory environment in which the individual works. This, of course, includes one's co-workers. Thus, one stands in a state of confusion as to which stimulus to respond to: the incentive plan or the co-worker. Whyte (1955) suggested that the incentive plan places the worker in a situation of being unable to determine whether the symbols ("words or physical objects that come to stand for relations of man to man, man to the physical world, and also for relations between man and physical objects and other men", p. 191) presented represent reward, punishment or a combination of the two. Whyte further suggested that

a given response would be highly influenced by the human relations within the situation.

In the development of a theory of human relations and incentives, Whyte expanded on the influence of co-workers and the work group first discussed by Roethlisberger and Dickson (summarized in Homans, 1950). Whyte brought out the fact that the workers perceived themselves as constituting one group and perceived management as constituting another group, both possessing their own norms and values, as well as their own structures and leaders. While production is a primary interest of both groups, it is viewed from two frames of reference. Management desires to maximize production and lower cost. The workers wish to produce enough to receive a fair wage; however, for reasons known only to the workers, they will not produce up to their full potential. Thus, workers conforming to the group norms that serve to restrict production add stability to the group. Whyte also points out that a change in the incentive rate would disrupt the stability of the group. From the worker's point of view, an increase in production would most likely result in a change in the incentive rate. Thus conforming to group norms that restricted production served two purposes: a) to increase stability of the work group, and b) to decrease the threat of disruption of group stability. From this point, Whyte

seems to be inadvertently leading to the conclusion that if the two groups could perhaps trust one another, norms that serve to restrict production would not possess such significance. Although Whyte (1955) suggested that "financial incentives are both a technical engineering problem and a human relations problem" (p.261), he failed to make suggestions or recommendations which would perhaps create a work environment conducive to a positive response to a piece-rate incentive system.

#### Group-Based Plans

In a reexamination of the Hawthorne effect, Parsons (1974) suggested additional reasons for the findings at Hawthorne that are supported by more recent research. Parsons noted that the generally accepted assumption that any change resulted in increased productivity is a myth. He stated that this assumption is not supported by all of the data gathered at Hawthorne. In an analysis of the inconsistent findings leading to the myth, Parsons noted several important distinctions between the different experimental situations. In the situations where production did, in fact, rise significantly (in the Relay Assembly Test Room), workers felt assured that incentives would not decrease, indicating a climate of trust between workers and management. Parsons suggests this is perhaps a necessary condition for rate increases, but not a sufficient



condition. Attention must also be given to the fact that, in the Relay Assembly Test Room, workers were paid on the small-group compensation basis (five workers constituted a group). Therefore, each worker perceived a closer relationship between pay and performance (March & Simon; Marriot; Whyte; cited in Parsons 1974). In addition, Parsons (1974) suggested that "subsequent performance was adjusted as a result of information received about prior performance" (p.928). Although research on the pure motivational effects of information feedback is controversial (Chapanis, 1964), Locke (1968) found that information feedback does have cueing effects, as well as a goal-setting motivational effect. Locke found that subjects established goals as a result of receiving feedback on prior performance. In summary, Parsons, referring to group plans, stated three conditions that would lead to a positive response to a piece-rate incentive system in a group situation: trust that management will not lower the incentive rate, pay that is more directly related to performance, and a system which allows for meaningful feedback on performance.

Numerous studies have researched the predictability of expectancy theory in regard to employee motivation and performance. Heneman and Schwab (1972) provided an informative evaluation of this research, as did Graen (1969).

Additional research has been specifically directed toward incentive and compensation systems and their relationships to employee performance, satisfaction and effort (Galbraith & Cummings, 1967; Hackman & Porter, 1968; Schwab, 1973; Schwab & Dyer, 1973; Yukl, Wexley, & Seymore, 1972). Of particular interest is a study carried out by Cammann and Lawler (1973). In an effort to compare two group-based pay incentive plans, one perceived as successful and one perceived as unsuccessful, the authors revealed three conditions that were thought to elicit a positive response to the incentive plan perceived to be successful: 1) a trusting climate between workers and management, 2) a close relationship between pay and performance, and 3) a pay plan that is easily understood and is therefore meaningful. Cammann and Lawler stated that expectancy theory predicts a positive response to an incentive plan where the three conditions are met. The employee's response to the incentive system was deemed positive by virtue of the fact that workers sought to produce as much as possible. In addition, there were no apparent norms present serving to restrict production and thus no sanctions, such as social isolation or ostracism, to ensure conformity of the norms. In fact, workers stated, "... the group and supervisor supported higher productivity" (p. 166). The conclusion that expectancy theory could successfully predict the

positive response was made after comparing performance behavior predicted by a mathematical model to actual employee performance. Although these findings of predictability remain important, the assessment of the three conditions which enhance the likelihood of a positive response to the incentive plan are of particular interest. These conditions are highly similar to the conditions stated by Parsons (1974) and the importance of each has been exemplified in one or more of the following studies which were directed toward expectancy theory and performance, satisfaction and effort: Galbraith and Cummings (1967), Graen (1969), James, Hartman, Stebbins, and Jones (1977), Lawler and Hackman (1969), and Schwab, (1973) suggested that tying pay to performance was a necessary condition in order for an incentive plan to exert a significant and predictable impact on performance. In addition, Schwab (1973) found that employees tended to be more highly motivated where pay was perceived as being directly related to performance. In reference to trust between management and workers, Lawler and Hackman (1969) concluded that trust was an important determinant of employee response to pay incentive systems. James, et al. (1977) found that psychological climate was significantly related to various instrumentalities; consequently, one may safely conclude that a trusting climate does effect

performance. In reference to "a plan that is easily understood," it would be virtually impossible to design an incentive plan where pay was perceived to be directly related to performance, but the plan was too complex to be understood. Cammann and Lawler (1973) reported that of the two group plans included in the study, the successful incentive plan was much less complex than the unsuccessful plan where one encountered great difficulty in calculating one's pay for a given time period.

#### Individual-Based Plans

Lawler (1971) stated, "It has been suggested, although not proven, that restrictive norms are less likely to develop when a group incentive plan is used" (p. 129). The fact that neither Cammann and Lawler (1973) nor Parsons (1974) addressed individual-based incentive plans, leaves a significant aspect of pay incentive plans unresolved. The purpose of the present investigation is to address the following issue: Are restrictive norms a thing of the past in a factory where large amounts of money are budgeted each year for human relations concerns, or do these norms still serve to undermine the work of engineers, human relations departments and management? More specifically, can restrictive norms be eliminated in individual pay-incentive situations, as well as in group pay-incentive situations through the presence of the three conditions (a trusting



climate between management and workers, a pay plan that is easily understood and thus allowing for meaningful feedback and a plan where pay is directly related to performance) suggested by Cammann and Lawler (1973) and Parsons (1974) and supported by additional recent applied psychological research? It is hypothesized that the presence of the three conditions will preclude the presence of restrictive norms in individual-based pay situations, as well as in group-based pay situations.



## Method

### Subjects

The subjects consisted of 60 individuals working under pay incentive plans in a large industrial manufacturing plant, 28 under a group plan and 32 under an individual plan. All subjects held skilled positions and were randomly selected. Basic demographic data were collected to determine the comparability of the two groups. The results are presented in Table 1. A slight difference in age was found between the means of the two groups ( $31.31 < 36.86$ ,  $p < .05$ ). A difference in the average number of years with the company was also significant ( $6 < 7.59$ ,  $p < .05$ ).

### Questionnaire

A questionnaire was used to collect the following data: demographic, control variables (presence of the three conditions) and dependent variable (absence or presence of restrictive norms). A copy of the questionnaire is presented in the Appendix. Items 1-4 were each measures of the control variables. Item 1 measured the degree of the perceived relationship between pay and performance. Items 2 and 4 measured varying degrees of understanding of the pay plan. Item 3 measured the degree of trust that the pay plan would not be changed.

Items 4-8 composed a scale to determine the absence or presence of restrictive norms. Absence or presence of

Table 1  
Comparison of Demographic Data

| Item   | Individual-Based<br>Pay Plans<br>(n=32) | Group-Based<br>Pay Plans<br>(n=28) | t-value |
|--|---|------------------------------------|---------|
| Age  | $\bar{x} = 31.31$<br>$s = 7.6$          | $\bar{x} = 36.86$<br>$s = 9.85$    | -2.42*  |
| Number of<br>Years<br>Completed<br>in School | $\bar{x} = 12.19$<br>$s = 1.42$         | $\bar{x} = 11.75$<br>$s = 1.6$     | 1.13    |
| Number of<br>Years in<br>Company             | $\bar{x} = 6$<br>$s = 2.63$             | $\bar{x} = 7.59$<br>$s = 2.19$     | -2.65*  |

\*  $p < .05$

restrictive norms could also be termed the degree of successfulness of a pay plan.

The degree of agreement or disagreement to each item was measured on a seven-point graphic rating scale. The numbers were defined as follows:

- 7 - Completely Agree
- 6 - Mostly Agree
- 5 - Slightly Agree
- 4 - Neither Agree nor Disagree
- 3 - Slightly Disagree
- 2 - Mostly Disagree
- 1 - Completely Disagree

### Procedure

The study was conducted in an industrial manufacturing plant that utilized individual-based and group-based pay incentive plans. All of the plans had been in effect for over 12 months. In fact, they had been relatively unchanged since the opening of this particular plant more than 10 years ago. The study was carried out inside the plant.

Subjects that worked the afternoon shift reported to work one-half hour early while subjects that worked the day shift remained one-half hour after the end of their shift. Thus, the study involved two separate sessions in which the subjects completed the questionnaires. The same procedure

was used in both sessions. Each subject was given a questionnaire which was marked to correspond with the type of pay plan under which they worked, I for those working under an individual-based plan and II for those working under a group-based plan. Questionnaires remained face-down until everyone received their copy. The experimenter then read the directions and asked if there were any questions regarding what they were to do. Subjects were asked to raise their hand upon completing the questionnaire so the experimenter could collect them. Everyone was asked to sit quietly until all questionnaires had been collected.

In addition, subjects were informed that the experimenter was an external consultant not employed by nor under contract by the organization. The subjects were also informed that the organization would, however, receive the results of the study.

### Results

Table 2 presents the group means for each item representing the control variables (presence or absence of the three conditions) for both groups. The table also presents the t-values calculated between the means of the two groups on each of the items.

The group means calculated for item 1 indicate that the employees in both the individual-based and group-based groups perceive a relationship between their pay and their performance. The difference between the two means was not significant at the .05 level of confidence.

The group means calculated for items 2 and 4, related items, indicate that the employees in both groups understand the pay plan and can actually calculate their weekly earnings. The difference between the two means was not significant at the .05 level of confidence.

The group means calculated for item 3 indicate that the employees in both groups are between slightly disagree and neutral in terms of their trust that the pay plan would not be changed regardless of how much they produced. The difference between the means was not significant at the .05 level of confidence.

The absence or presence of restricted norms was measured on a four-item scale. Group means were calculated for both groups to determine whether or not the employees



perceived restrictive norms operating within their work group. As defined by the rating scale, a mean of greater than 4 would indicate that the employees perceived no restrictive norms operating within the work group. The means, 6.12 for the individual-based group and 5.76 for the group-based group, indicate that both groups perceive no norms operating within the work group which serve to restrict production. A t-test indicated that the difference between the means was not significant ( $t = 1.2$ ,  $\alpha = .05$ ).

Table 2  
Group Means Describing Work Attitudes

| Item   | Individual-Based | Group-Based | *t-   |
|--|------------------|-------------|-------|
|  | Pay Plans        | Pay Plans   | value |
|  | (n=32)           | (n=28)      |       |
| 1. The amount of<br>pay that I<br>earn depends on<br>how hard I work.                      | 5.25             | 5.43        | -.36  |
| 2. I understand how<br>my wages are<br>calculated.   | 5.97             | 6.32        | 1.06  |
| 3. No matter how much<br>I produce, the<br>company will<br>never change my<br>rate of pay. | 3.53             | 3.43        | .16   |
| 4. I can easily<br>figure out<br>how much I should<br>be paid at the<br>end of the week.   | 5.22             | 5.96        | -1.48 |

\* No t-values were significant ( $\alpha = .05$ )

### Discussion

The results indicate that there are no restrictive norms operating within either of the work groups that participated in the study. This finding appears to be a statement regarding the success of the pay plans in eliciting a positive reaction from the employees. Subjects reported that they seek to earn as much as possible by producing as much as possible and do not feel any pressure to produce less than possible from fellow workers, nor do fellow workers interfere with their attempts to achieve high productivity. More often than not, management would agree that attitudes and opinions such as these would be an indication of a successful pay incentive plan, or plans, as the case may be. The importance of these findings is voluminous. Every pay incentive plan developed and utilized by management is intended to elicit a positive response. However, the factors that affect the degree of success of a pay plan are of overriding importance. Isolation of these factors could lead to a prescription for successful pay plans. Although this study was not intended to isolate factors that could elicit a positive response to pay incentive plans, the study intended to and was successful in providing information on three factors believed to be important in eliciting a positive response to a pay incentive plan.

The three factors which were measured in this study are the relationship between pay and performance, understanding of the pay plan and an attitude of worker trust toward management regarding the pay plan. The results indicate that two of the factors are present to a very high degree in both the groups participating in the study. Subjects in both groups strongly agreed that the amount of pay they earned depended on how hard they worked. This indicates a strong relationship between pay and performance, a factor given significance by both Lawler (1973) and Parsons (1974). Subjects in both groups also strongly agreed that they understood the pay plan under which they worked, another factor given significance by both Lawler (1973) and Parsons (1974). In fact, subjects in both groups stated that they were able to calculate their weekly pay, which was a bit surprising to management and industrial engineers. This is not to say that management and engineers intended for the plan to be difficult to understand. It was believed a problem could exist here because the plans under which both groups worked had to allow for downtime and changeovers, as well as for production of the individual or the group. The fact that the workers understood the pay incentive plan under which they work indicates they were receiving meaningful feedback regarding their performance.



There was overwhelming evidence of the presence of two influential factors in both groups participating in the study. Evidence of the presence of a third factor, trust that management would not change the pay plans, no matter how much one produced, is not so clear-cut. Means of 3.53 for Group I and 3.43 for Group II appear to indicate that both groups are at least neutral. That is, they are neither in agreement nor in disagreement with the statement "No matter how much I produce, the Company will never change my rate of pay". An important fact to bring out here is the variance of the scores obtained on this item for both groups. A variance of 6.45 for Group I and a variance of 5.07 for Group II indicates that a high degree of disagreement exist among the workers in both groups concerning trust that management will never change the pay plan as a result of exceedingly high production. Workers were either highly confident that management would not change the plan or they were quite sure that exceedingly high production would result in a change in the pay plan. The issue is, without a doubt, affected by present economic conditions. Although the company has experienced no major layoffs or cutbacks in production, present economic conditions hardly allow one to feel immune from the possibility of layoffs and cutbacks.



The effect of present economic conditions on worker attitudes leads the experimenter to consider that the minimal lack of trust among workers that management will not change the rate of pay may not be a true lack of trust in management at all. It is apparent that the organization has no control over the present national economic condition, and thus has very little control over worker attitudes concerning possible changes in incentive rates. The fact that factors external to the organization may have elicited a neutral response to the item measuring the presence of this condition is particularly likely in this instance as the organization has never lowered rates or altered the pay system unless a change has been made in the work method or machinery. The management reportedly continues to make this policy clear to all employees and are proud of their adherence to this policy.

Nonetheless, data do not allow the the experimenter to state that the trust in management factor is present for either of the two groups. However, the fact that workers reported an absence of restrictive norms in both groups indicates that the organizational climate is such that workers under both individual-based and group-based plans work to earn as much as possible by producing as much as possible. Is this not the bottom line in the development and implementation of incentive pay plans; to create

conditions that elicit positive responses to the structure of the pay plan? It seems apparent that workers, in this study, have weighed the possible positive and negative outcomes and have responded positively to both the individual-based plan and the group-based plan.

In summary, it was hypothesized that presence of the three factors would preclude the presence of restrictive norms in group-based, as well as individual-based pay incentive plans. The results indicate that perhaps the presence of only two of the factors precluded the presence of restrictive norms in both groups in this situation as the presence of one of the factors is unclear. This finding is contrary to a suggestion made by Lawler (1971), and mentioned previously, that restrictive norms are less likely to be present in a group-based pay incentive plan. It is important to point out that the external validity of these findings is somewhat limited by virtue of the fact that it was carried out in only one environment. However, the study did partially confirm the findings of Lawler (1973) and the suggestions of Parsons (1974), both of whom specified the importance of the three factors (relationship between pay and performance, understanding the pay plan and trust that management will not change the pay plan) in precluding the presence of restrictive norms. Thus the findings remain important in the quest to isolate the

factors which enhance the success of pay incentive plans. Related future research should perhaps provide more empirical evidence on the factors discussed in this study in addition to discovering conditions or methods to maximize the effects of the factors.

## APPENDIX

Age \_\_\_\_\_ Number of Years in This Position \_\_\_\_\_

Number of Years Completed in School \_\_\_\_\_

Number of Years with the Company \_\_\_\_\_

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INSTRUCTIONS: Carefully read the following statements and choose the description on the 7-point scale provided for each statement which most closely describes your degree of agreement or disagreement by placing the corresponding number from the scale in the blank beside each statement.

\_\_\_\_\_ 1. The amount of pay that I earn depends on how hard I work.

- 7 = Completely Agree
- 6 = Mostly Agree
- 5 = Slightly Agree
- 4 = Neither Agree nor Disagree
- 3 = Slightly Disagree
- 2 = Mostly Disagree
- 1 = Completely Disagree

\_\_\_\_\_ 2. I understand how my wages are calculated.

- 7 = Completely Agree
- 6 = Mostly Agree
- 5 = Slightly Agree
- 4 = Neither Agree nor Disagree
- 3 = Slightly Disagree
- 2 = Mostly Disagree
- 1 = Completely Disagree

\_\_\_\_\_ 3. No matter how much I produce, the Company will never change my rate of pay.

- 7 = Completely Agree
- 6 = Mostly Agree
- 5 = Slightly Agree
- 4 = Neither Agree nor Disagree
- 3 = Slightly Disagree
- 2 = Mostly Disagree
- 1 = Completely Disagree



- \_\_\_\_\_ 4. I can easily figure out how much I should be paid at the end of the week.

7 = Completely Agree  
6 = Mostly Agree  
5 = Slightly Agree  
4 = Neither Agree nor Disagree  
3 = Slightly Disagree  
2 = Mostly Disagree  
1 = Completely Disagree

- \_\_\_\_\_ 5. I work at a pace that best fits my own attitude as to how much I should produce.

7 = Completely Agree  
6 = Mostly Agree  
5 = Slightly Agree  
4 = Neither Agree nor Disagree  
3 = Slightly Disagree  
2 = Mostly Disagree  
1 = Completely Disagree

- \_\_\_\_\_ 6. I try to earn as much as possible by producing as much as I can.

7 = Completely Agree  
6 = Mostly Agree  
5 = Slightly Agree  
4 = Neither Agree nor Disagree  
3 = Slightly Disagree  
2 = Mostly Disagree  
1 = Completely Disagree

- \_\_\_\_\_ 7. I don't feel any pressure from fellow workers to produce less than I can produce.

7 = Completely Agree  
6 = Mostly Agree  
5 = Slightly Agree  
4 = Neither Agree nor Disagree  
3 = Slightly Disagree  
2 = Mostly Disagree  
1 = Completely Disagree

- \_\_\_\_\_ 8. Fellow workers do not interfere with my attempts to produce as much as I can.

7 = Completely Agree  
6 = Mostly Agree  
5 = Slightly Agree  
4 = Neither Agree nor Disagree  
3 = Slightly Disagree  
2 = Mostly Disagree  
1 = Completely Disagree

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