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## Industrial incentive testing: The effects of pilot programs on the performance of non-pilot groups

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INDUSTRIAL INCENTIVE TESTING:  
THE EFFECTS OF PILOT PROGRAMS  
ON THE PERFORMANCE OF NON-PILOT GROUPS

A Thesis  
Presented to the  
Department of Psychology  
and the  
Faculty of the Graduate College  
University of Nebraska

In Partial Fulfillment  
of the Requirements for the Degree  
Master of Arts  
University of Nebraska at Omaha

by  
Thomas E. Kranda  
August, 1979

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# THESIS ACCEPTANCE

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## Abstract

The question of central interest in this study was, "do incentive testing pilot programs adversely affect the performance of non-pilot groups?" The current managerial practice of testing new motivational techniques on small subgroups within an organization provides employees with a recognizable discrepancy between the effort to reward payoffs among co-workers. Independent variables manipulated in this study were: (a) differing levels of preferential treatment, and (b) membership versus non-membership in a bonus testing pilot group. Dependent variables included task quantity, task quality, subject's estimates of productivity had they been in each of four treatment conditions, and treatment group attractiveness ratings. Planned comparisons revealed that a cash bonus program used throughout the study increased task productivity and was seen by subjects as being a desirable condition to work under. Comparisons also showed a preference for a work situation in which no worker received bonus payments over a situation in which a minority of the work force benefited from such payments.



A pilot program is a management initiated program confined to a subgroup of an organization for the expressed purpose of examining on a trial basis and in a controlled manner the apparent effectiveness of a new management directive.

The present study is concerned primarily with the identification and investigation of any potential influences which pilot programs may exert upon the performance of non-pilot groups.

Implemented on a trial basis, a pilot program enables management to exercise its responsibility of organizational direction without surrendering its resources and energies to a potentially ineffective or possibly harmful endeavor. In addition, the utilization of pilot programs enables management to retain a far greater degree of manipulative control than is typically found in organization wide programs.

In theory and intent the pilot group serves as a test group and as such is useful in the evaluation of a program's effectiveness. However, careful examination of a pilot group's performance often reveals that group improvement can be attributed to factors not exclusively attributable to the experimental variable(s) alone. For example, the simple clarification of performance criteria, which often accompanies the implementation of a pilot program can be a significant source of improved pilot group performance. Additional sources of potential performance influences include the Hawthorne Effect (Roethlisberger & Dickson, 1939), inter-group competition or group cohesiveness (Zajonc, 1965), or supervisory style (Fiedler, 1967) to name a few. Many contributory influences may be overlooked by those charged with the

evaluation of pilot group and non-pilot group behavior. Furthermore, these influences may lead to an inaccurate evaluation of the true effectiveness of the procedures being tested by the pilot program.

Organization researchers have attempted to identify and deal with phenomena which may influence the performance of individuals within a group. Indeed, this is an important aspect of the heavily researched field of social psychology. There does exist however, a substantial lack of adequate observation and analysis within an organization with respect to the performance of those groups not identified as the group of primary concern.

Typically, the success or failure of a pilot program is assessed by comparing the pilot group performance with the performance of some control group. This control group may be the pilot group prior to the introduction of the pilot program, as in a time-series evaluation design, or it may be a group similar to the pilot group but excluded from the pilot program. Both methods of comparison fail to consider what influences a pilot program might have on non-pilot groups.

Interest in the identification of performance influencing factors operative within a pilot program, or within those groups aware of but not participating in a pilot program, stems from two current practices in modern industry. First is the increase in popularity of behavior modification techniques employed in situations other than strict piece rate production (Heiman & Lazer, 1975). Second is the widespread use of pilot groups as a method by which management evaluates this motivational procedure (Hamner & Hamner, 1976). According to Hamner and Hamner, only in recent years have the principles embodied

in behavior modification been formally applied to individuals in a work setting.

Reports of behavior modification principles applied to industrial settings are filled with testimony to the effectiveness of such programs. For a review and critique of behavior modification in management see Schinier (1974). Typically such incentive systems are tested using a small percentage of a particular organization's work force. Such a situation (a minority group participating in a new incentive program while the majority of the work unit toils under the standard or old incentive program) lends itself to interpretations of differential treatment, and possibly preferential treatment on behalf of the minority or pilot group.

Recent organizational behavior modification literature describes programs designed to increase the frequency of target behaviors which are routinely engaged in by all members of an organization. These target behaviors include such behaviors as attendance and punctuality (Pedalino & Gamboa, 1974) and simple routine tasks (Yukl, Wexley & Semore, 1972). Frequently organizational behavior modification programs reinforce specific behaviors performed by members of a small sample of the work group while ignoring those same behaviors exhibited by those not participating in the pilot program.

In the examples cited above, many of which deal with clear-cut behaviors such as attendance, it is reasonable to assume that a non-pilot group worker would be cognizant of a policy of differential treatment, a policy that allocates different levels of rewards while expecting equivalent levels of effort.

The idea of comparing one's work situation with another's is not new. This idea is dealt with quite effectually by Adams' (1963) Equity Theory. Defined by Adams at a later date (1965), "inequity exists for Person whenever he perceives that the ratio of his outcomes to inputs and the ratio of Other's outcomes to inputs are unequal" (p. 423). The concept of inequity as an imbalance in some form of exchange relationship has been proposed by others (Homans, 1961; Patchen, 1961). However, it was the formulation by Adams and the subsequent research design used to test this formula that propelled Equity Theory to the center stage of organizational behavior research during the 1960s and 1970s. As with other areas of motivational research, the data presented in equity literature are seldom conclusive and often contradictory (Goodman & Friedman, 1971; Lawler, 1968). The literature does, however, serve to establish the fact that "equity," as a theoretical construct, is a useful tool with which to further our understanding of work behavior in a social setting.

The increased popularity of organizational behavior modification is clear and the frequency with which this technique is introduced by way of pilot projects is equally apparent. Any concern for the possible influence of social interaction between pilot and non-pilot group members, be such interaction performance stimulants or performance suppressants, has yet to be systematically researched. Consequently, the experimental questions to which this study is addressed are: (a) Is there any systematic influence which tends to effect pilot group performance so as to produce a greater difference between the performances of a pilot group and a non-pilot group than could

be accounted for by the benefits being tested? and (b) Is there any systematic influence which tends to effect non-pilot group performance so as to produce a greater difference between the performances of a pilot group and a non-pilot group than could be accounted for by the benefits being tested?

In Equity Theory terms, components of this "systematic influence" assume general labels of "overpayment inequity" when addressing the situation in which members of a pilot group receive benefits from which all others have been excluded, and "underpayment inequity" when addressing a situation in which members of a non-pilot group are excluded from specific benefits.

Traditional laboratory tests of the equity model often entail a rather straightforward manipulation of overpayment and underpayment conditions. It is not uncommon for the experimenter to explain the existence of a stratified pay rate structure, be it hourly or piece rate and then assign subjects to one of the usually three rate conditions (Lane & Messe, 1972). This procedure results in a convenient underpay, equitable pay, and overpay tricondition design. Of course other conditions have been employed in the past to induce feelings of inequitable treatment. Noteworthy examples include the use of praise or criticism of a subject's work qualifications (Adams & Rosenbaum, 1962; Wiener, 1970) and assignment to payment conditions by way of fortuitous (or unfortuitous) circumstances (Pritchard, Dunnette & Gorgenson, 1972). For a listing of Equity studies and inequity induction methodologies see Adams (1976). Discussion of the legitimacy of ego-involvement and treatment by circumstances as equity/inequity

manipulations may be found in Andrews and Valenvi (1970), Goodman and Friedman (1970) and Pritchard (1969).

Discussion of the diverse methodologies by which "inequity" is summoned up for examination, whether such methodologies are themselves praised or criticized, serves two purposes in the introduction of this study: (a) this diversity across methodologies underscores the difficulty experimenters have had in their attempts to maintain design consistency when investigating a single theory across different experimental conditions. This is not to say that the basic social exchange concepts of Equity Theory are difficult to understand, but is simply intended to point out the difficulties and inconsistencies which are encountered when attempting to operationally define equity/inequity under different experimental conditions, and (b) by discussing some of the particulars of past equity studies it may perhaps be easier to see that this study is not a true "equity study" but rather a study to determine the unintended effects of pilot programs on the performance of both pilot and non-pilot groups.

The experimenter sought to use neutral phrases throughout this study to describe experimental conditions. Phrases such as, subjects were "included in" or "excluded from" a "bonus program," and questions such as, "what are the potential effects of any 'systematic influence' which may arise from such conditions?" were preferred over the more Equity biased labels of overpayment inequity, underpayment inequity and equity restoration reactions, etc.

It should be made clear, however that throughout the formative stages of this experiment the experimenter did rely heavily upon the

Equity model of work behavior to help formulate procedural methodologies and facilitate the solution of methodological problems.

In as much as this study is not a test of a theory, but rather an investigation of work behavior under specific work conditions, the experimenter has enlisted three distinct theories of work behavior to aid in the interpretation of the findings of this study. Specifically, the design of this study offers useful comparison between the predictive abilities of Equity Theory, Reinforcement Theory and the Hawthorne Effect. Further discussion of the appropriateness of a comparison between these three theories is presented in the hypotheses section of this paper.

The experimental questions addressed in this study required the use of a differential pay structure consistent with the practice of utilizing pilot groups in the testing of the usefulness of a newly implemented behavior modification incentive system. To this end the experimenter selected a differential pay manipulation that parallels the introduction of a piece rate or contingent reinforcement pay schedule upon an already existing hourly incentive system.

The independent variables manipulated in this study were: (a) differing levels of preferential treatment, and (b) membership/non-membership in a bonus testing pilot group. Comparisons were based upon four separate treatment groups.

Subjects in group one were aware of the fact that they were members of a minority group receiving preferential treatment. Group one was labeled the Experimental Bonus Group ( $E_b$ ).

Subjects in group two were aware of the fact that they were

members of a majority group which had been deprived of the opportunity to participate in an attractive bonus program. Group two was labeled the Experimental No Bonus Group ( $E_{nb}$ ).

Subjects in group three worked under the same bonus condition as group  $E_b$ , however, because members of group three were told that all subjects in the experiment were working under the same bonus condition, their treatment would not be considered as preferential. Group three was labeled the Control Bonus Group ( $C_b$ ).

Subjects in group four worked under the same no bonus condition as group  $E_{nb}$ , however, because members of group four were told that all subjects in the experiment were working under the same no bonus condition, their treatment would not be described as being one of deprivation. Group four was labeled the Control No Bonus Group ( $C_{nb}$ ).

Preferential and deprivation treatment were operationally defined as participation in or exclusion from, a cash bonus payment program.

Dependent variables were: (a) task quantity, (b) task quality, (c) subjects' speculation as to their own levels of productivity had they been in each of the four experimental conditions, and (d) subjects' ranking of the relative attractiveness of the four test conditions. These dependent variables allowed exploration of the effects of differential treatment from a behavioral (a & b) as well as a cognitive (c & d) orientation.

### Hypotheses

Bonus program. The first three hypotheses were formulated to test the effectiveness of the bonus program used throughout this study.



An abundance of Reinforcement Theory literature (Berger, Cumming & Heneman, 1972; Chung & Vickery, 1976; Yukl, Latham & Pursell, 1976) supports the prediction that workers receiving a cash bonus will complete a greater number of work units than will workers receiving no bonus. Hypothesis one was stated as follows:

H 1. The quantity of work produced by a group ( $C_b$ ) given a piece rate bonus for work produced will be greater than the quantity of work produced by a similar group ( $C_{nb}$ ) not given a bonus for work produced. (Test; One Tail, Mann-Whitney U Statistic; quantity  $C_b = C_{nb}$ . Note - Comparisons between responses from subjects in group  $C_b$  with responses of subjects in group  $C_{nb}$  only.)

Preliminary tests were conducted to evaluate the usefulness of the planned bonus program. Specifically these tests were intended to give the experimenter insight into the behavioral and cognitive effects of the bonus program as well as some practical experience with regards to administration of the program. Results of these tests showed that the bonus program did not influence work behavior to any appreciable degree. The experimenter believes that the probable cause of this was the short trial period (10 minutes) and the small cash amounts involved. These two factors appeared to combine to provide subjects with inconsequential amounts of cash and perceived inappreciable differences of payoff between high and low performers. The length of the experimental task period used in the actual study was set at forty-five minutes with the level of cash incentive such that a subject might easily earn over two dollars during the test session. Hypothesis One was proposed in order to test the bonus program under the actual experimental conditions.

Although preliminary tests did not show the bonus program to influence work behavior to an appreciable degree, they did demonstrate that the bonus program was recognized by subjects as being more desirable than the no bonus condition. For this reason it was also predicted (H 2) that workers would state that they would complete more work units if they received a cash bonus than if they received no cash bonus, and (H 3) that workers would state that they would find work conditions in which they received a cash bonus more desirable than work conditions in which they received no bonus. Hypotheses 2 and 3 were stated as follows:

H 2. Subjects in all groups will state that they believe they would complete more task units if they were members of a work group ( $C_b$ ) receiving a cash bonus for task units completed than if they were members of a work group ( $C_{nb}$ ) receiving no bonus incentive. (Test; One Tail, Wilcoxon Matched Pair Signed Ranks T-test; speculative productivity,  $C_b = C_{nb}$ . Note - Comparisons between responses about conditions  $C_b$  &  $C_{nb}$  from all subjects in all groups).

H 3. Subjects in all groups will state that they will find it more desirable to be members of a work group ( $C_b$ ) receiving a bonus for work produced than to be members of a work group ( $C_{nb}$ ) receiving no bonus incentives. (Test; One Tail, Sign Test, attractiveness ratings,  $C_b = C_{nb}$ . Note - Comparisons between responses about conditions  $C_b$  &  $C_{nb}$  from all subjects in all groups.)

Pilot group effect. The next four hypotheses were formulated to help answer the experimental question: Are there any systematic influences which tend to effect pilot group performances so as to produce greater differences between the performances of a pilot group

and a non-pilot group than could be accounted for by the company benefits being investigated?

Task quantity. The experimental design of this study, and the preferential treatment conditions under which pilot group performances were tested allows comparisons to be made between the predictive abilities of three established theories of human behavior. The three theories of interest are: Equity Theory (Adams, 1965), Reinforcement Theory (Skinner, 1969), and the Hawthorne Effect (Roethlisberger & Dickson, 1939).

Equity Theory proposes that under the preferential treatment conditions of this experiment, workers in group  $E_b$  would be subject to overpayment anxieties and would consequently restrict (compared to group  $C_b$ ) their inputs in an attempt to control those excessive outcomes which are tied directly to inputs (Adams, 1963). Based upon Equity Theory, the dependent variables of task quantity (H 4 a), speculative productivity (H 4 c), and attractiveness ratings (H 4 d) were predicted to be less for group  $E_b$  than for group  $C_b$ .

Reinforcement Theory holds that behavior is determined by the history, contingency, and value of behavior related consequences (Skinner, 1969). In keeping with this line of reasoning the actual schedule of bonus payments, the contingency of the bonus payment and the value of the bonus program should be major determinants of subjects' behavior. Based upon Reinforcement Theory there appears to be no basis for predicting that the dependent variables of task quantity (H 5 a), task quality (H 5 b), speculative productivity (H 5 c) and attractiveness rating (H 5 d) would be different for

group  $E_b$  as compared to group  $C_b$ .

The Hawthorne Effect can be described as the temporary improvement in worker productivity which is associated with a change in the working condition but which is ultimately the result of improved morale rather than any real improvement in the work environment (Roethlisberger & Dickson, 1939). Based upon the Hawthorne Effect, the dependent variables of task quantity (H 6 a), task quality (H 6 b), speculative productivity (H 6 c), and attractiveness ratings (H 6 d) were predicted to be greater for group  $E_b$  than group  $C_b$ .

A unique hypothesis was formulated for each dependent variable as it related to each of the three theories under examination. Although the procedure resulted in a large number of hypotheses, the use of specific hypotheses for each of corresponding theory prepared the way for an orderly discussion of results.

Hypotheses investigating possible pilot group effects as such effects may be measured by the dependent variable of task quantity were stated as follows:

H 4 a. Members of a work group ( $E_b$ ) receiving a bonus as preferential treatment will produce a lower quantity of task units than will members of a work group ( $C_b$ ) receiving a bonus when said bonus represents a level of payment common to all work groups. (Test; Two Tail, Mann-Whitney U Statistic; quantity,  $E_b = C_b$ . Note - Comparison between responses from  $E_b$  &  $C_b$  only.)

H 5 a. Members of a work group ( $E_b$ ) who are receiving a bonus as preferential treatment will produce the same quantity of task units as will members of a work group who are receiving that same

bonus when such a bonus represents a level of payment common to all work groups. (Test; Two Tail, Mann-Whitney U Statistic; quantity,  $E_b = C_b$ . Note - Comparisons between responses from groups  $E_b$  &  $C_b$  only.)

H 6 a. Members of a work group ( $E_b$ ) receiving a bonus as preferential treatment will produce a higher quantity of task units than will members of a work group ( $C_b$ ) receiving that same bonus when such a bonus represents a level of payment common to all work groups. (Test; Two Tail, Mann-Whitney U Statistic, quantity  $E_b = C_b$ . Note - Comparisons between responses from groups  $E_b$  &  $C_b$  only.)

Task quality. Based upon piece rate work conditions, Equity Theory predicts that the dependent variable of task quality (H 4 b) will be greater for group  $E_b$  than for group  $C_b$ . This higher quality of work is attributable to a worker's perceived need to increase task related inputs in an effort to earn that portion of his payments which he considers excessive (Walster, Bersheid & Walster, 1973). Reinforcement Theory and Hawthorne Effect predictions (H 5 b & H 6 b) are based upon the same arguments presented above.

H 4 b. Members of a work group ( $E_b$ ) receiving a bonus as preferential treatment will produce task units of a higher quality than will members of a work group ( $C_b$ ) receiving a bonus when said bonus represents a level of payment common to all work groups. (Test; Two Tail Mann-Whitney U Statistic; quality,  $E_b = C_b$ . Note - Comparisons between responses from group  $E_b$  &  $C_b$  only.)

H 5 b. Members of a work group ( $E_b$ ) who are receiving a bonus as preferential treatment will produce task units of the same quality

as will members of a work group ( $C_b$ ) who are receiving that same bonus when such a bonus represents a level of payment common to all work groups. (Test; Two Tail, Mann-Whitney U Statistic; quality,  $E_b = C_b$ . Note - Comparisons between responses from groups  $E_b$  &  $C_b$  only.)

H 6 b. Members of a work group ( $E_b$ ) receiving a bonus as preferential treatment will produce task units of a higher quality than will members of a work group ( $C_b$ ) receiving the same bonus when such a bonus represents a level of payment common to all work groups. (Test; Two Tail, Mann-Whitney U Statistic; quality,  $E_b = C_b$ . Note - Comparisons between responses from groups  $E_b$  &  $C_b$  only.)

Speculative productivity. The Equity Theory prediction is based upon the existence of overpayment anxieties and the resulting motivation to control excessive outcomes (Adams, 1963) as discussed elsewhere. The Reinforcement Theory and Hawthorne Effect predictions (H 5 c & H 6 c) are based upon the same arguments presented above.

Hypotheses investigating possible pilot group effects as such effects may be measured by the dependent variable of speculative productivity were stated as follows:

H 4 c. Workers in all groups will state that they believe that they would produce less if they were members of a work group ( $E_b$ ) receiving a bonus as preferential treatment than if they were members of a work group ( $C_b$ ) receiving that same bonus when such a bonus represents a level of payment common to all work groups. (Test; Two Tail, Wilcoxon Matched Pair Signed Rank T-test; speculative productivity,  $E_b = C_b$ . Note - Comparisons between responses about

conditions  $E_b$  &  $C_b$  from all subjects in all groups.)

H 5 c. Workers in all groups will state that they believe they would produce the same quantity of work units as members of a work group ( $E_b$ ) receiving a bonus as preferential treatment as they would as members of a work group ( $C_b$ ) receiving that same bonus when such a bonus represented a level of payment common to all work groups.

(Test; Two Tail Wilcoxon Matched Pair Signed Ranks T-test; speculative productivity,  $E_b = C_b$ . Note - Comparisons between responses about conditions  $E_b$  &  $C_b$  from all subjects in all groups.)

H 6 c. Workers in all groups will state that they believe they would produce a greater quantity of work if they were members of a work group ( $E_b$ ) receiving a bonus as preferential treatment than if they were members of a work group ( $C_b$ ) receiving that same bonus when such a bonus represented a level of payment common to all work groups. (Test; Two Tail, Wilcoxon Matched Pair Signed Ranks T-test; speculative productivity  $E_b = C_b$ . Note - Comparisons between responses about conditions  $E_b$  &  $C_b$  from all subjects in all groups.)

Attractiveness Ratings. The Equity Theory prediction (H 4 d) is based upon the Adams argument presented earlier and the Reinforcement Theory prediction (H 5 d) and the Hawthorne Theory prediction (H 6 d) are based upon the same arguments presented above.

Hypotheses investigating possible pilot group effects as such effects may be measured by the dependent variable of treatment condition attractiveness rating were stated as follows:

H 4 d. Workers in all groups will state that they would find the prospect of working in a work group ( $E_b$ ) which was receiving a

bonus as preferential treatment less attractive than the prospect of working in a work group ( $C_b$ ) receiving the same amount of bonus, when such a bonus represents a level of payment common to all work groups. (Test; Two Tail, Sign Test; attractiveness ratings,  $E_b = C_b$  from all subjects in all groups.)

H 5 d. Workers in all groups will state that they would find the prospect of working in a work group which is receiving a bonus as preferential treatment no more or less attractive than the prospect of working in a work group receiving the same bonus when such a bonus represented a level of payment common to all work groups. (Test; Two Tail, Sign Test; attractiveness rating,  $E_b = C_b$ . Note - Comparisons between responses about conditions  $E_b$  &  $C_b$  from all subjects in all groups.)

H 6 d. Workers in all groups will state that they would find the prospect of working in a work group ( $E_b$ ) which was receiving a bonus as preferential treatment more attractive than the prospect of working in a work group ( $C_b$ ) receiving that same bonus when such a bonus represented a level of payment common to all work groups. (Test; Two Tail, Sign Test; attractiveness rating,  $E_b = C_b$ . Note - Comparisons between responses about conditions  $E_b$  &  $C_b$  from all subjects in all groups.)

The predictions supported by the above theories are nearly mutually exclusive. That is to say, the possible outcomes for each of the above comparisons (H 4, H 5 & H 6) supports only one of the three theories under investigation, as shown below:



<u>Quantity</u>		<u>Quality</u>	
H 4 a:	Equity ( $E_b < C_b$ )	H 4 b:	Equity ( $E_b > C_b$ )
H 5 a:	Reinforcement ( $E_b = C_b$ )	H 5 b:	Reinforcement ( $E_b = C_b$ )
H 6 a:	Hawthorne Effect ( $E_b > C_b$ )	H 6 b:	Hawthorne Effect ( $E_b > C_b$ )
<u>Speculative Productivity</u>		<u>Attractiveness Ratings</u>	
H 4 c:	Equity ( $E_b < C_b$ )	H 4 d:	Equity ( $E_b < C_b$ )
H 5 c:	Reinforcement ( $E_b = C_b$ )	H 5 d:	Reinforcement ( $E_b = C_b$ )
H 6 c:	Hawthorne Effect ( $E_b > C_b$ )	H 6 d:	Hawthorne Effect ( $E_b > C_b$ )

There is one exception to this mutual exclusivity which centers around the dependent variable of task quality. In this case both Equity Theory and the Hawthorne Effect support the prediction that members of a work group receiving preferential treatment will produce work units of a higher quality than will members of a work group who are receiving the same bonus when such a bonus represents a level of payment common to all groups (H 4 b & H 6 b).

Non-pilot group effect. The final four hypotheses were formed to help answer the experimental question: Are there any systematic influences which tend to affect non-pilot group performances so as to produce greater differences between the performances of a pilot group and a non-pilot group than could be accounted for by the company benefits being investigated?

As in the tests of pilot group performances, the design of this study allows for a comparison between the predictions of Equity Theory and Reinforcement Theory (the Hawthorne Effect no longer represents a potentially relevant explanation for the outcomes generated by investigations into the performance of non-pilot groups).

Equity Theory proposes that under the deprivation treatment conditions of this experiment, members of group  $E_{nb}$  would be subject

to underpayment anxieties and would consequently restrict (compared to group  $C_{nb}$ ) their input in an attempt to resolve these feelings of inequity. Based upon Equity Theory research investigating underpay hourly inequities (Adams, 1965; Walster, Walster & Berscheid, 1978) the dependent variables of task quantity (H 7 a), task quality (H 7 b), speculative productivity (H 7 c) and attractiveness ratings (H 7 d) were predicted to be less for group  $E_{nb}$  than for group  $C_{nb}$ .

According to Reinforcement Theory, there is no reason to predict that the dependent variables of task quantity (H 8 a), task quality (H 8 b), speculative productivity (H 8 c) and attractiveness ratings (H 8 d) would be different for groups  $E_{nb}$  and  $C_{nb}$ .

As with tests for possible pilot group effects, a unique hypothesis was formulated for each dependent variable as it related to Equity Theory and Reinforcement Theory.

Task quantity. The Equity Theory prediction (H 7 a) and the Reinforcement Theory prediction (H 8 a) are based upon the arguments presented above.

Hypotheses investigating possible non-pilot group effects as such effects may be measured by the dependent variable task quantity were stated as follows:

H 7 a. Members of a work group ( $E_{nb}$ ) who are aware of but denied participation in an attractive bonus program will produce fewer task units than will members of a work group ( $C_{nb}$ ) excluded from the same bonus program when such excluded group has no knowledge of the existence of a bonus program. (Test; Two Tail, Mann-Whitney U Statistic, quantity,  $E_{nb} = C_{nb}$ . Note - Comparisons between responses from groups  $E_{nb}$  &

$C_{nb}$  only.)

H 8 a. Members of a work group ( $E_{nb}$ ) who are aware of but denied participation in an attractive bonus program will produce the same quantity of task units as members of a work group ( $C_{nb}$ ) who are excluded from that same bonus program when such excluded group has no knowledge of the existence of a bonus program. (Test; Two Tail, Mann-Whitney U Statistic, quantity,  $E_{nb} = C_{nb}$ . Note - Comparisons between responses from groups  $E_{nb}$  &  $C_{nb}$  only.)

Task quality. The Equity Theory prediction (H 7 b) and the Reinforcement Theory prediction\* (H 8 b) are based upon the arguments presented above.

Hypotheses investigating possible non-pilot group effects as such effects may be measured by the dependent variable task quality were stated as follows:

H 7 b. Members of a work group ( $E_{nb}$ ) who are aware of but denied participation in an attractive bonus program will produce task units of lower quality than will members of a work group ( $C_{nb}$ ) excluded from the same bonus program when such excluded work group has no knowledge of the existence of a bonus program. (Test; Two Tail, Mann-Whitney U Statistic; quality,  $E_{nb} = C_{nb}$ . Note - Comparisons between responses from group  $E_{nb}$  &  $C_{nb}$  only.)

H 8 b. Members of a work group ( $E_{nb}$ ) who are aware of but denied participation in an attractive bonus program will produce task units of the same quality as will members of a work group ( $C_{nb}$ ) who are excluded from that same bonus program when such excluded group has no knowledge of the existence of a bonus program. (Test; Two Tail,

Mann-Whitney U Statistic; quality,  $E_{nb} = C_{nb}$ . Note - Comparisons between responses from groups  $E_{nb}$  &  $C_{nb}$  only.)

Speculative productivity. The Equity Theory prediction (H 7 c) and the Reinforcement Theory prediction (H 8 c) are based upon the arguments presented above.

Hypotheses investigating possible non-pilot group effects as such effects may be measured by the dependent variable of speculative productivity were stated as follows:

H 7 c. Workers in all groups will state that they believe they would produce fewer task units if they were members of a work group who were aware of but denied participation in an attractive bonus program than if they were members of a work group who were excluded from the same bonus program when such excluded work group had no knowledge of the existence of a bonus program. (Test; Two Tail, Wilcoxon Matched Pair Signed Ranks T-test; speculative productivity,  $E_{nb} = C_{nb}$ . Note - Comparisons between responses about conditions  $E_{nb}$  &  $C_{nb}$  from all subjects in all groups.)

H 8 c. Workers in all groups will state that they believe they would produce the same quantity of task units as members of a work group ( $E_{nb}$ ) who were aware of but denied participation in an attractive bonus program as they would as members of a work group ( $C_{nb}$ ) who were excluded from the same bonus program when such excluded work group had no knowledge of a bonus program. (Test; Two Tail, Wilcoxon Matched Pair Sign Rank T-test; speculative productivity  $E_{nb} = C_{nb}$ . Note - Comparisons between responses about conditions  $E_{nb}$  &  $C_{nb}$  from all subjects in all groups.)

Attractiveness ratings. The Equity Theory prediction (H 7 d) and the Reinforcement Theory prediction (H 8 d) are based upon the arguments presented above.

Hypotheses investigating possible non-pilot group effects as such effects may be measured by the dependent variable of treatment condition attractiveness rating were stated as follows:

H 7 d. Workers in all groups will state that they would find the prospect of working in a work group in which members were aware of but denied participation in an attractive bonus program less attractive than the prospect of working in a work group whose members were excluded from the same bonus program when such excluded group had no knowledge of the existence of a bonus program. (Test; Two Tail, Sign Test; attractiveness ratings,  $E_{nb} = C_{nb}$ . Note - Comparisons between responses about conditions  $E_{nb}$  &  $C_{nb}$  from all subjects in all groups.)

H 8 d. Workers in all groups will state that they would find the prospect of working in a work group ( $E_{nb}$ ) whose members were aware of but denied participation in an attractive bonus program no more or less attractive than the prospect of working in a work group ( $C_{nb}$ ) in which members were excluded from the same bonus program when such excluded group had no knowledge of the bonus program. (Test; Two Tail, Sign Test; attractiveness rating,  $E_{nb} = C_{nb}$ . Note - Comparisons between responses about conditions  $E_{nb}$  &  $C_{nb}$  from all subjects in all groups.)

### Method

#### Subjects

Seventy-four subjects were recruited through the Psychology

Department subject pool. All subjects were informed that they would be working on a test validation project for approximately one and one quarter hours. All subjects received extra course credit in their introductory psychology class for their experimental participation.

### Material

The procedure used to produce subject productivity data was a symbol recognition, symbol counting task. Both a short form (Appendix A) and a long form (Appendix B) was used. Whereas the short form allowed subjects to record their responses directly on the task sheet, the long form required a set of separate answer sheets. Answer sheets were of two varieties. One version (Appendix C) contained a yes-no question regarding subjects' participation in the bonus condition. The other version (Appendix D) contained no reference to the bonus condition.

Instructions for the short form of the task (Appendix E) included a brief description of the short form, three instructive statements regarding the correct method of scoring the task, and an example of a completed task line.

Instructions for the long form of the task were of three varieties. All "long form" instructions included a brief introduction to the long form as well as three instructive statements regarding the correct method of scoring the task.

Version one of the instructions included a description of a bonus system, and an announcement that only a select few would be participating in this program (Appendix F). This version was given

to groups  $E_b$  and  $E_{nb}$ . Groups  $E_b$  and  $E_{nb}$  thus learned that only group  $E_b$  would receive bonus payments.

Version two of the instructions included a description of the bonus program as well as an announcement that all subjects would participate in the bonus (Appendix G). This version was given to group  $C_b$  only.

Version three of the instructions contained no reference to bonus payments but included only that information common to all three versions (Appendix H). This version was given to group  $C_{nb}$  only.

#### Procedure

The total subject population of 74 was divided into four groups with subject numbers of 19, 19, 19 and 17. Each group was independently recruited and scheduled. This division was for the sole purpose of providing the experimenter with smaller more manageable group sizes. Experimental sessions were scheduled twice a week for two consecutive weeks.

Each of the experimental test sessions was conducted in a large classroom on the University campus. The classroom contained 92 stationary chairs each with its own swing up desk top. The seating arrangement allowed for adequate and uniform separation of treatment groups as the experiment progressed.

After subjects arrived at the test sight, the purpose of the meeting was reviewed and a cover story was conveyed by way of reading from a prepared statement (Appendix I). The cover story stated that the experimenter was a journalism student who had developed and was now attempting to validate a new form of proofreading aptitude test.

Subjects were to complete two forms of the new aptitude test. Toward the end of the session subjects would be tested on the standardized "California Test of Proofreading Aptitude" (fictitious) and the journalism student would then have the data necessary to validate his new aptitude test.

Following this announcement, the experimenter distributed the short form of the experimental task, along with its instructions. Subjects were allowed to work on the short form for a period of seven minutes, after which time the experimenter collected the short forms and announced a brief (five minute) rest period. During the rest period the experimenter scored and ranked the short forms on the basis of quantity of task completed. Following this ranking procedure, the experimenter sorted the short form into four groups so as to match subjects on the basis of initial task productivity.

After the rest period, the experimenter called subjects' attention to the existence of markers previously affixed to twenty of the classroom desks. Subjects were directed to note the location and label affixed to those desks that were marked. The labeled desks were arranged in groups in the four corners of the classroom. For labeling purposes, these groupings were identified by the Roman numerals I through IV.

After directing subjects' attention to the labeled desks, the experimenter announced that from the original group of approximately twenty subjects, four new groups were to be formed. The new groups were directed to take up the locations designated by the labeled desks. The need for the new groupings was attributed to the statistical nature of the comparisons to be made during the test validation procedure.



After these announcements the experimenter assigned subjects to the new groups on the basis of quantity of task completed on the previously scored short forms. Once subjects had taken up their positions in the assigned groupings, the experimenter distributed the long form of the task with each group receiving the appropriate version of instructions.

Subjects were told to read their instructions and to face forward when they had completed. When all subjects had read their instructions, the experimenter started subjects on the long form of the "aptitude test" and allowed them to work uninterrupted for a period of 45 minutes.

#### Independent Variables

Experimental Bonus Condition,  $E_b$ . Members of group  $E_b$  received the long form of the task, a set of answer sheets and a sheet containing the following instructions:

##### Please Note:

In order to determine if I can make more efficient use of those that volunteer for this test validation project, I will be offering a bonus payment to members of one of the four groups. This bonus will be in the form of cash, and the amount of money that can be earned will depend upon the amount of proof-reading completed. Bonus payments will be at the rate of 4 cents per line. This amounts to \$2.00 per page. The amount of bonus earned will be determined separately for each individual, and those working under the bonus system will receive their payment at the end of the test period.

Group I has been selected as the trial group, and as

such will be the only group to have the opportunity to earn the bonus payment. Those in group I be sure to mark your answer sheet to indicate that you will be receiving the bonus. Those in Groups II, III, and IV please be sure to indicate on your answer sheet that you will not be receiving the bonus.

Members of group  $E_b$  received that version of the answer sheet containing a yes-no question concerning subject's participation in the bonus program. Members of this group were instructed to indicate on their answer sheet that they were participating in the bonus program.

Experimental No Bonus Condition,  $E_{nb}$ . Members of group  $E_{nb}$  received the long form of the task, a set of answer sheets and a sheet containing the same instructions supplied to group  $E_b$ . It should be noted that whereas group  $E_b$ , the "minority receiving bonus" learned via their instruction sheet that they were the only group to be receiving the bonus, group  $E_{nb}$ , "majority receiving no bonus" was informed that they, along with groups III and IV had been excluded from the bonus program. Members of group  $E_{nb}$  also received answer sheets containing the yes-no question regarding participation in the bonus program. However, due to their particular group membership they were required to indicate on their answer sheet that they had been excluded from the bonus program.

Control for the Experimental Bonus Condition,  $C_b$ . Members of group  $C_b$  received the long form of the task, a set of answer sheets and a sheet containing the following instructions:

Please Note:

As you know, each of you is receiving course credit

for participating in this project. In addition to this extra credit I am offering a bonus payment as well. This payment will be in the form of cash, and the amount of money that can be earned will depend upon the amount of proofreading completed. Bonus payments will be at the rate of 4 cents per line. This amounts to \$2.00 per page. The amount of bonus earned will be determined separately for each individual, and the payments will be made at the end of the test period.

It should be noted that this group worked under the identical incentive or bonus program as group  $E_b$ . However, group  $C_b$  was told that all subjects in the experiment were working under the bonus condition. Members of this group received that version of the answer sheet having no question regarding participation in or exclusion from the bonus program.

Control for Experimental No Bonus Condition,  $C_{nb}$ . Members of group  $C_{nb}$  received the long form of the task, answer sheets and task instructions. The task instruction sheet distributed to this group contained no information regarding the existence of a bonus program. The answer sheet used by this group also had no reference to the bonus program.

Dependent Variables. Productivity measures, generated during task completion, were in the form of task quantity and task quality.

A manipulation check was used to measure the effectiveness of the experimental manipulations. This check consisted of a seven item true-false survey and was used to determine whether or not each subject perceived his treatment condition as intended. The nature

of the check questions was such that one or more errors constituted justification for assuming a subject had not understood his instructions fully or that the manipulation had in some way failed in its intended purpose. The manipulation check may be found in Appendix J.

After completing the manipulation check, each subject read descriptions of the four treatment conditions and was asked to rank the conditions according to the conditions relative attractiveness.

After ranking, subjects were asked to estimate what their productivity would have been on the experimental task had they been in each of the treatment conditions (Appendix K).

Following the 45 minute test period all subjects were debriefed, those subjects not working under the bonus condition were dismissed and those working under the bonus condition were paid.

Statistical Analysis. Non-parametric statistics were the preferred tools of analysis since the data generated by this study are at the ordinal level of measurement, and there is no basis for the assumption of normality of score distribution as is required for the use of parametric statistics.

The Mann-Whitney U Statistic (Senter, 1966) was used on all comparisons concerning task quantity and task quality. The Wilcoxon Matched Pair Signed Ranks T-test (Klugh, 1970) was used in the analysis of speculative productivity data. The Sign Test (Klugh, 1970) was used to analyze attractiveness ratings.

## Results

### Manipulation Check

Three subjects were disqualified from group  $E_b$ , three from

group  $E_{nb}$ , four from group  $C_b$  and one from group  $C_{nb}$  due to one or more errors on manipulation check items. Table 4 shows the number of subjects remaining in each treatment condition for the remainder of analysis.

#### Bonus Program

Quantity. Hypothesis 1  $Qt(C_b > C_{nb})$  was accepted. The null hypothesis  $Qt(C_b = C_{nb})$  was rejected at  $p < .005$ , One Tail Test.

Speculative Productivity. Hypothesis 2  $S.P.(C_b > C_{nb})$  was accepted. The null hypothesis  $S.P.(C_b = C_{nb})$  was rejected at  $p < .0025$ , One Tail Test.

Attractiveness Rating. Hypothesis 3  $A.R.(C_b > C_{nb})$  was accepted. The null hypothesis  $A.R.(C_b = C_{nb})$  was rejected at  $p < .00025$ , One Tail Test.

Results of tests of the first three hypotheses demonstrate the intended experimental effect of the bonus program. For a summary of the results see Table 1.

#### Pilot Group Effect

Quantity. The Reinforcement Theory version (H 5 a) of this hypothesis, represented by the null hypothesis  $Qt(E_b = C_b)$  was not rejected. Consequently, neither of the directional hypotheses H 4 a (Equity), nor H 6 a (Hawthorne Effect),  $Qt(E_b < C_b)$  and  $Qt(E_b > C_b)$  was accepted.

Quality. The Reinforcement Theory version (H 5 b) of this hypothesis, represented by the null hypothesis  $Q1(E_b = C_b)$  was not rejected, consequently neither of the directional hypotheses H 4 b (Equity) nor H 6 b (Hawthorne Effect) both described by  $Q1(E_b > C_b)$  was accepted.

Speculative Productivity. The Reinforcement Theory version H 5 c of this hypothesis represented by the null hypothesis  $S.P.(E_b = C_b)$  was not rejected. Consequently, neither of the directional hypotheses H 4 c (Equity) nor H 6 c (Hawthorne Effect)  $S.P.(E_b < C_b)$  and  $S.P.(E_b > C_b)$  respectively, was accepted.

Attractiveness Rating. The Reinforcement Theory version (H 5 d) of this hypothesis, represented by the null hypothesis  $A.R.(E_b = C_b)$ , was not rejected. Consequently, neither of the directional hypotheses H 4 d (Equity) nor H 6 d (Hawthorne Effect)  $A.R.(E_b < C_b)$  and  $(E_b > C_b)$  respectively was accepted.

Results of tests of hypotheses 4 through 6 do not offer evidence for the existence of unintended influences acting upon the performance of pilot group members. For a summary of the results see Table 2.

#### Non-Pilot Group Effect

Quantity. The Reinforcement Theory version (H 8 a) of this hypothesis, represented by the null hypothesis  $Qt(E_{nb} = C_{nb})$  was not rejected. Consequently, the directional hypothesis H 7 a (Equity)  $Qt(E_{nb} < C_{nb})$  was not accepted.

Quality. The Reinforcement Theory version (H 8 b) of this hypothesis, represented by the null hypothesis  $Q1(E_{nb} = C_{nb})$  was not rejected. Consequently, the directional hypothesis H 7 b (Equity)  $Q1(E_{nb} < C_{nb})$  was not accepted.

Speculative Productivity. The Reinforcement Theory version (H 8 c) of this hypothesis, represented by the null hypothesis  $S.P.(E_{nb} = C_{nb})$  was not rejected. Consequently, the directional hypothesis H 7 c (Equity),  $S.P.(E_{nb} < C_{nb})$  was not accepted.

Attractiveness Rating. The directional hypothesis H 7 d (Equity),

$(E_{nb} < C_{nb})$  was accepted. The null hypothesis A.R.  $(E_{nb} = C_{nb})$  was rejected at  $p < .012$ , One Tail Test.

Results of tests of the dependent variable of task quantity, task quality, and speculative productivity do not offer evidence for unintended influences acting upon the performances of non-pilot group members. Results of treatment condition attractiveness ratings offer evidence in support of social comparison processes active within the pilot group/non-pilot group work environment. For a summary of these results see Table 3.

### Discussion

Briefly, the results of this study demonstrate that (a) workers recognize and respond to the cash incentive program in a positive fashion, (b) the work condition of preferential treatment, that condition representing pilot group membership, did not cause pilot group members to respond differently than their control group, (c) the work condition of relative deprivation, that condition representing non-pilot group membership, caused non-pilot group members to state a preference for work conditions in which no worker received a bonus over conditions in which only a select few received a bonus.

Subjects' recognition of, and response to the bonus program was central to the viability of this study. The legitimacy of the bonus manipulation was demonstrated at the behavioral level, via task quantity and at the cognitive level via speculative productivity levels and stated desirability of the bonus condition. The relationship between the behavioral and cognitive modes of subject response is noteworthy. Of primary importance was subjects' cognitive reaction

to the bonus manipulation. It was critical to the success of the pilot group membership/non-membership manipulation that the bonus condition be recognized as being more desirable than the no bonus condition. Indeed this desirability was demonstrated. That the bonus condition boosted behavioral response levels served to verify the servability of the manipulation.

Earlier the question had been asked "do incentive testing pilot programs influence the performance of pilot group members in any systematic way which cannot be accounted for strictly by the benefits being tested?" To help answer this question comparisons were made between groups  $E_b$  and  $C_b$ . Specifically these comparisons were made in order to ascertain if workers receiving a cash incentive representing preferential treatment would respond differently than workers receiving the same cash incentive when said incentive is offered to all workers. The results of these comparisons were viewed with Equity Theory, Reinforcement Theory and the Hawthorne Effect predictions in mind.

Results did not offer support for Equity Theory based predictions. Under the experimental conditions examined in this study, workers receiving preferential treatment, here representing members of a pilot group, did not respond as though they were being inequitably overcompensated in comparison to their non-pilot group co-workers. Opposite the Equity Theory predictions were the predictions based upon the Hawthorne Effect. The Hawthorne Effect predictions holding that preferential treatment would stimulate or improve morale, resulting in improved performance also were not supported.

These comparisons, investigating pilot group behavior, revealed



that there was no significant difference between the performance of workers receiving a bonus as preferential treatment and workers receiving the same level of reward as standard payment. Ultimately these results showed that workers working under the same conditions of reinforcement performed in like fashion irregardless of potential social comparison influences.

The three way comparison between Equity Theory, Reinforcement Theory and the Hawthorne Effect does not represent a truly critical three way comparison. Although the Equity-Hawthorne Effect comparison predicting opposite directionality of results was of a critical nature, the Reinforcement Theory prediction serves only to accommodate those results which ultimately support neither Equity Theory nor the Hawthorne Effect. The failure to reject the null hypothesis ( $E_b = C_b$ ) does not offer support for the Reinforcement Theory prediction, it does at this point however, seem sufficient to allow Reinforcement Theory to stand as the more parsimonious model of work behavior under the comparisons made.

The question of central interest in this study was, "do incentive testing pilot programs adversely affect the performance of non-pilot groups?" Comparisons were made between groups  $E_{nb}$  and  $C_{nb}$  in order to ascertain if workers who are aware of but denied participation in a bonus program would perform differently than workers excluded from the same bonus program without having knowledge of its existence.

Comparisons here did show that workers recognize and respond to differences in treatment. Specifically, subjects stated their preferences to work under conditions in which no workers received

bonus payments rather than under conditions in which only a select few received bonus payments. Here support is given for the existence of social comparison processes active within the pilot group/non-pilot group work situation. Workers do compare the desirability of their work conditions against those of their fellow workers. Under the conditions examined in this study, workers dislike for the differences in treatment did not cause any significant differences in the quantity or quality of work units produced.

Interestingly, if the pilot group/non-pilot group conditions examined parallels the overpay/underpay conditions of Equity Theory it is likely that workers would be more sensitive to the non-pilot group conditions than the pilot group conditions just as workers are more sensitive to the conditions of underpayment inequity than they are to overpayment inequity. Results show that subjects apparently do not experience any form of anxiety when presented with the pilot group manipulation however, when confronted with the non-pilot group manipulation subjects are motivated to show their displeasure with the work situation.

If the pilot group/non-pilot group comparison is conceptually similar to the overpayment/underpayment inequity comparison it appears reasonable that influences affecting non-pilot groups would be more readily measured than influences affecting pilot groups. Along this line of reasoning results do offer testimony in support of this similarity of concepts.

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# Appendix A

## PROOFREADING APTITUDE S

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## Appendix B

## PROOFREADING APTITUDE L

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@	\$	?	"	26)	* \$ ( \$ ) # + % " ? # ) # ( * \$ + % " ? # \$ @ % # & # + % " ? \$ * % & \$ # % # + % @ #	(26
@	%	*	+	27)	* @ & # \$ # \$ + \$ % " ? # & \$ # ) ( * & \$ ! % @ \$ # & \$ # \$ # & ( * * \$ # \$ ! @ # \$	(27
@	%	+	%	28)	( # * \$ + % " ? \$ * & \$ ! \$ @ % # \$ # & % ( * & \$ # % # \$ @ @ + % " ? # & \$ & % \$ # &	(28
@	%	@	!	29)	& \$ # % \$ # ! \$ @ * # & \$ # % \$ : " ? % * & \$ # # + # % " ? # & \$ % # & \$ # @ # \$ %	(29
\$	?	)	*	30)	* & \$ # # ( ) ( @ * & \$ # % # @ % @ & # ( # * & \$ # \$ % * # + \$ % " ? \$ * % & \$ % \$	(30
%	*	&	@	31)	* & \$ # % @ + % " ? # ) ( * # & \$ @ % # + % " ? # \$ @ & \$ # % @ * & \$ # % # @ !	(31
%	#	!	\$	32)	* & % \$ # # + ) % " ? @ * & \$ % ! \$ @ # \$ # \$ # + % " ? \$ & # \$ # * # & \$ @ # \$ %	(32
#	!	\$	*	33)	& \$ % \$ @ ! + ) ( * @ & ! \$ @ % " ? # \$ # & # \$ # & # * @ # & @ % # & \$ * # \$ # \$ @	(33
?	(	&	#	34)	? " % + ) ( * % & \$ # ! + @ % " ? @ * & @ \$ # % \$ # * # + % " ? @ * # & # \$ @ # \$ %	(34
?	+	*	\$	35)	& \$ * \$ & \$ # % @ ( * # & # \$ # ( # * \$ @ * @ + # % " ? \$ * & \$ # ) ( * \$ & % ( ) \$ *	(35
!	\$	(	+	36)	* # ( ) \$ + # % " ? \$ & \$ % ! \$ @ % # \$ # & * ( ) ( \$ * & # + % " ? " % & @ # ?	(36
#	%	*	%	37)	* & \$ # # % \$ # @ \$ ! # @ % @ \$ # % \$ * \$ & % + % " ? % ( \$ * & # ( # * \$ # % \$ # \$	(37
!	\$	&	?	38)	( * & \$ # # @ ! ) ( * & \$ # % \$ # * # ( # ) \$ ( * & # @ % " ? + # ( # * & \$ # &	(38
"	?	@	!	39)	* & \$ # # + % " ? \$ " # * \$ & \$ + # % " ? # % @ \$ # & \$ + # ) ( * @ \$ # % \$ # \$ # \$	(39
(	*	%	)	40)	* & \$ * # ( \$ ) # ( * & \$ @ % ! ) @ ( * + # % " ? # # ( \$ * \$ # + % " ? " # \$ @ ?	(40
\$	%	&	@	41)	* & \$ % @ % ! @ & \$ # & % ( ) ( % + \$ % " ? \$ * % & \$ # # % @ \$ # % \$ * % & \$ % \$	(41
%	&	@	!	42)	* & % \$ # & \$ # & @ * & # \$ # % \$ # & @ & ! * @ & ( * \$ + % " ? % * % & \$ # \$ # % \$	(42
@	\$	*	?	43)	* & \$ # # * # ) ( \$ + # % " ? \$ * # & \$ # % @ \$ ! \$ @ % # & \$ # \$ * % ( \$ * % & \$ # \$	(43
#	\$	\$	*	44)	\$ # & # \$ # % @ & @ \$ # * @ ) ( & * % \$ # ) ( ) # ( \$ & # & \$ # + " ? % * \$ # % \$ # ?	(44
!	\$	\$	%	45)	! \$ # \$ # & * # & \$ # % @ # \$ # ) ( * % + % " ? % * \$ & \$ # ? " # & \$ # % # \$ # ? \$ #	(45
%	\$	!	#	46)	& \$ # % # & ( * # & @ \$ # * \$ + ) \$ % " ? \$ * # & \$ ( # & \$ @ * # & \$ # * & \$ # &	(46
#	\$	&	)	47)	* & \$ # # * & ! \$ @ & \$ # % \$ # * # & \$ # + % " ? \$ * \$ # & \$ % @ # & \$ # & \$ # \$	(47
\$	%	&	(	48)	* & % \$ # * # + % " ? # ( # * & \$ # % ! % @ & \$ # % & \$ # & @ ) ( # * & \$ # # \$ # \$	(48
!	#	@	\$	49)	& \$ # % # \$ # @ \$ # % @ ) ( * # & @ \$ # @ ) # ( # * @ + % " ? # " % + % " ? # @ " ?	(49
?	%	*	%	50)	? " ) # ( * # + % " ? # ( # * # & \$ % " ? % & * \$ ( ) # ( * \$ @ % ! \$ @ \$ # & \$ # \$	(50



## APPENDIX C

40

ID \_\_\_\_\_

BONUS?    yes\_\_ no\_\_

1)    \_\_\_\_\_

2)    \_\_\_\_\_

3)    \_\_\_\_\_

4)    \_\_\_\_\_

5)    \_\_\_\_\_

6)    \_\_\_\_\_

7)    \_\_\_\_\_

8)    \_\_\_\_\_

9)    \_\_\_\_\_

10)    \_\_\_\_\_

11)    \_\_\_\_\_

12)    \_\_\_\_\_

13)    \_\_\_\_\_

14)    \_\_\_\_\_

15)    \_\_\_\_\_

16)    \_\_\_\_\_

17)    \_\_\_\_\_

18)    \_\_\_\_\_

19)    \_\_\_\_\_

20)    \_\_\_\_\_

21)    \_\_\_\_\_

22)    \_\_\_\_\_

23)    \_\_\_\_\_

24)    \_\_\_\_\_

25)    \_\_\_\_\_

ID \_\_\_\_\_

BONUS?    yes\_\_ no\_\_

26)    \_\_\_\_\_

27)    \_\_\_\_\_

28)    \_\_\_\_\_

29)    \_\_\_\_\_

30)    \_\_\_\_\_

31)    \_\_\_\_\_

32)    \_\_\_\_\_

33)    \_\_\_\_\_

34)    \_\_\_\_\_

35)    \_\_\_\_\_

36)    \_\_\_\_\_

37)    \_\_\_\_\_

38)    \_\_\_\_\_

39)    \_\_\_\_\_

40)    \_\_\_\_\_

41)    \_\_\_\_\_

42)    \_\_\_\_\_

43)    \_\_\_\_\_

44)    \_\_\_\_\_

45)    \_\_\_\_\_

46)    \_\_\_\_\_

47)    \_\_\_\_\_

48)    \_\_\_\_\_

49)    \_\_\_\_\_

50)    \_\_\_\_\_

ID				
1)	_____	_____	_____	_____
2)	_____	_____	_____	_____
3)	_____	_____	_____	_____
4)	_____	_____	_____	_____
5)	_____	_____	_____	_____
6)	_____	_____	_____	_____
7)	_____	_____	_____	_____
8)	_____	_____	_____	_____
9)	_____	_____	_____	_____
10)	_____	_____	_____	_____
11)	_____	_____	_____	_____
12)	_____	_____	_____	_____
13)	_____	_____	_____	_____
14)	_____	_____	_____	_____
15)	_____	_____	_____	_____
16)	_____	_____	_____	_____
17)	_____	_____	_____	_____
18)	_____	_____	_____	_____
19)	_____	_____	_____	_____
20)	_____	_____	_____	_____
21)	_____	_____	_____	_____
22)	_____	_____	_____	_____
23)	_____	_____	_____	_____
24)	_____	_____	_____	_____
25)	_____	_____	_____	_____

ID				
26)	_____	_____	_____	_____
27)	_____	_____	_____	_____
28)	_____	_____	_____	_____
29)	_____	_____	_____	_____
30)	_____	_____	_____	_____
31)	_____	_____	_____	_____
32)	_____	_____	_____	_____
33)	_____	_____	_____	_____
34)	_____	_____	_____	_____
35)	_____	_____	_____	_____
36)	_____	_____	_____	_____
37)	_____	_____	_____	_____
38)	_____	_____	_____	_____
39)	_____	_____	_____	_____
40)	_____	_____	_____	_____
41)	_____	_____	_____	_____
42)	_____	_____	_____	_____
43)	_____	_____	_____	_____
44)	_____	_____	_____	_____
45)	_____	_____	_____	_____
46)	_____	_____	_____	_____
47)	_____	_____	_____	_____
48)	_____	_____	_____	_____
49)	_____	_____	_____	_____
50)	_____	_____	_____	_____

## Appendix E

This is the short form of the proofreading aptitude test. It is labeled, Proofreading Aptitude S. This test consists of ten numbered lines of randomly displayed symbols. To the left of each line is a set of four separate symbols and to the right of each line is a series of four blank spaces.

### INSTRUCTIONS:

- 1) Determine the number of times each of the symbols shown at the left of each line appears embedded in that particular line.
- 2) Record the number of times each symbol appears per line in the space provided at the right of each line.
- 3) Because there are four symbols to the left of each line, you will be "proofreading" each line four times. One time for each symbol.

### EXAMPLE:

@ \$ ¢ &	1)	!#0%¢&*\$( *&#¢%\$#!\$0%#¢\$%\$#¢\$&¢\$*	(1	2	4	5	___
# % * ?	2)	\$#@+¼"?\$*&#¢!&@¢%#)( *&\$%+\$¼"? "#?"	(2	___	___	___	___

## Appendix F

This is the long form of the proofreading test. It is labeled Proofreading Aptitude L. The long form of this test is very similar to the short form with which you are familiar. The only notable difference between the two forms is the manner in which the score for each line is recorded. The long form requires that you record your answers on a separate answer sheet.

INSTRUCTIONS:

- 1) Determine the number of times each of the symbols shown at the left of each line appears embedded in that particular line.
- 2) Record in the appropriate space on the answer sheet, the number of times each symbol appears per line.
- 3) Because there are four symbols to the left of each line, you will be "proofreading" each line four times. One for each symbol.

PLEASE NOTE:

In order to determine if I can make more efficient use of those that volunteer for this test validation project, I will be offering a bonus payment to the members of one of the four groups. This bonus will be in the form of cash, and the amount of money that can be earned will depend upon the amount of "proofreading" completed. Bonus payments will be at the rate of 4¢ per line. This amounts to \$2.00 per page. The amount of bonus earned will be determined separately for each individual, and those working under the bonus system will receive their payment at the end of the test period.

Group I has been selected as the trial group, and as such will be the only group to have the opportunity to earn the bonus payment.

## Appendix F (Continued)

Those in Group I please be sure to mark your answer sheet to indicate that you will be receiving the bonus. Those in Groups II, III and IV please be sure to indicate on your answer sheet that you will not be receiving the bonus.

## Appendix G

This is the long form of the proofreading aptitude test. It is labeled Proofreading Aptitude L. The long form of this test is very similar to the short form with which you are familiar. The only notable difference between the two forms is the manner in which the score for each line is recorded. The long form requires that you record your answers on a separate answer sheet.

### INSTRUCTIONS:

- 1) Determine the number of times each of the symbols shown at the left of each line appears embedded in that particular line.
- 2) Record, in the appropriate space on the answer sheet, the number of times each symbol appears per line.
- 3) Because there are four symbols to the left of each line, you will be "proofreading" each line four times. One time for each symbol.

### PLEASE NOTE:

As you know, each of you is receiving course credit for participating in this project. In addition to this extra credit, I am offering a bonus payment as well. This payment will be in the form of cash, and the amount of money that can be earned will depend upon the amount of "proofreading" completed. Bonus payments will be at the rate of 4¢ per line. This amounts to \$2.00 per page. The amount of bonus earned will be determined separately for each individual, and payments will be made at the end of the test period.

## Appendix H

This is the long form of the proofreading aptitude test. It is labeled, Proofreading Aptitude L. The long form of this test is very similar to the short form with which you are familiar. The only notable difference between the two forms is the manner in which the score for each line is recorded. The long form requires that you record your answers on a separate answer sheet.

### INSTRUCTIONS:

- 1) Determine the number of times each of the symbols shown at the left of each line appears embedded in that particular line.
- 2) Record, in the appropriate space on the answer sheet, the number of times each symbol appears per line.
- 3) Because there are four symbols to the left of each line you will be proofreading each line four times, one time for each symbol.

## Appendix I

The purpose of our working together this afternoon is to determine the usefulness of a new proofreading test which is to be used in the prediction of proofreading ability. As you may know, proofreading is a skill which is not necessarily related to intelligence or reading ability. About the only thing proofreading skill has been related to so far is a person's score on an actual proofreading test.

I am presently in the process of developing a less cumbersome and time consuming test with which to measure proofreading ability.

This afternoon you will be working on a new form of proofreading test. After working on the new form you will take a few minutes, at the end of the period, to complete the California Test of Proofreading Aptitude, (show CTPA). The CTPA has been shown to be a useful tool in predicting proofreading skill. From your scores on these two tests I will be able to make some useful comparisons. If, for instance, those of you that score high on one test score high on the other test and those that score low on one score low on the other, the two tests will roughly equal in measuring proofreading aptitude. And because the CTPA is a very good predictor of proofreading skill, the new test will be a good predictor as well.

In the interest of developing the simplest test possible I will be giving you a long form as well as a short form of the new test. You will be tested on the short form first.

Again, the reason for all this testing is to find a test that will be less cumbersome, less costly and more easily administered than the California Test of Proofreading Aptitude.



## Appendix I (Continued)

Let me add at this point that the more lines you "proofread" on this new test, the more valuable your scores will be in the validation process. This is because of the statistical nature of the comparisons being made. Needless to say, you should still strive to be as accurate as you can with your scores. Now let me hand out your instructions.

Please read your instructions carefully, as I mentioned, I am attempting to develop a test requiring a minimum of clerical administration. It is hoped that you will receive all the information you need from the written instructions. Therefore, I will not be able to answer any questions until the testing is complete. If you have a comment to offer regarding the written instructions, I will be happy to hear them as soon as the testing is complete.

## Appendix J

Please respond True or False to the following statements. You need not try to second guess the experimenter, this is only a check to see how well you read your instructions.

- T    F    We were all performing the same task, i.e., "proofreading."
- T    F    I will receive extra credit for my participation.
- T    F    All participants will receive extra credit for their participation.
- T    F    Myself and most of the other participants will not be receiving cash, however those in one of the groups will be receiving cash for their participation.
- T    F    I was in the one group that will receive cash, however most will not receive cash for their participation.
- T    F    We will all be paid cash for our participation.
- T    F    No one will receive cash for their participation.

## Appendix K

This experiment dealt with 4 separate experimental conditions or groups:

- Group A. Received extra credit plus cash (4¢ per line scored or \$2.00 for completing the test) for their efforts. This group was told that it was the only group of the 4 to receive the cash bonus.
- Group B. Received extra credit but no cash for their efforts. This group was told that it was one of 3 groups receiving no cash and that one of the 4 groups was receiving a cash bonus.
- Group C. Received extra credit plus cash and was told that all 4 groups were receiving the same treatment.
- Group D. Received extra credit but no cash and was told that all 4 groups were receiving the same treatment.

Please rank the 4 groups according to their attractiveness to you. Assign one letter to each of the blanks below. 1 = most, 4 = least attractive.

1 \_\_\_\_ 2 \_\_\_\_ 3 \_\_\_\_ 4 \_\_\_\_

Please identify by letter which of the 4 groups you were in. \_\_\_\_

Please write the number of lines you completed on the long form of the "aptitude test." \_\_\_\_

Now please speculate as to how many lines you think you would have completed had you been in each of the other conditions.

If I was in group "A" I would have completed \_\_\_\_ lines because,

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## Appendix K (Continued)

If I was in group "B" I would have completed \_\_\_\_\_ lines because,

\_\_\_\_\_  
\_\_\_\_\_.

If I was in group "C" I would have completed \_\_\_\_\_ lines because,

\_\_\_\_\_  
\_\_\_\_\_.

If I was in group "D" I would have completed \_\_\_\_\_ lines because,

\_\_\_\_\_  
\_\_\_\_\_.

Table 1  
Predictions and Results, Bonus Program

Comparison	Dependent Variable	Prediction	Results	H <sub>0</sub> :	Significance
$C_b \text{ V } C_{nb}$	quantity of work	$C_b > C_{nb}$	$C_b > C_{nb}$	$C_b = C_{nb}$	$\underline{p} < .005^1$
$C_b \text{ V } C_{nb}$	speculative productivity	$C_b > C_{nb}$	$C_b > C_{nb}$	$C_b = C_{nb}$	$\underline{p} < .0025^2$
$C_b \text{ V } C_{nb}$	attractiveness ratings	$C_b > C_{nb}$	$C_b > C_{nb}$	$C_b = C_{nb}$	$\underline{p} < .00025^3$

<sup>1</sup>Mann-Whitney U Statistic, (Senter, 1965)

<sup>2</sup>Wilcoxon Matched Pair Signed Ranks T-test, (Klugh, 1970)

<sup>3</sup>Sign Test, (Klugh, 1970)

Table 2  
Predictions and Results, Pilot Group Effect

Comparison	Dependent Variable	Source of Predictions			Results	$H_0$ :	Significance
		Equity	Reinforcement	Hawthorne Effect			
$E_b \text{ V } C_b$	quantity of work	$E_b < C_b$	$E_b = C_b$	$E_b > C_b$	$E_b = C_b$	$E_b = C_b$	no significant difference <sup>1</sup>
$E_b \text{ V } C_b$	quality of work	$E_b > C_b$	$E_b = C_b$	$E_b > C_b$	$E_b = C_b$	$E_b = C_b$	no significant difference <sup>1</sup>
$E_b \text{ V } C_b$	speculative productivity	$E_b < C_b$	$E_b = C_b$	$E_b > C_b$	$E_b = C_b$	$E_b = C_b$	no significant difference <sup>2</sup>
$E_b \text{ V } C_b$	attractiveness ratings	$E_b < C_b$	$E_b = C_b$	$E_b > C_b$	$E_b = C_b$	$E_b = C_b$	no significant difference <sup>3</sup>

<sup>1</sup>Mann-Whitney U Statistic, (Senter, 1965)

<sup>2</sup>Wilcoxon Matched Pairs Signed Ranks T-test, (Klugh, 1970)

<sup>3</sup>Sign Test, (Klugh, 1970)

Table 3

## Predictions and Results, Non-Pilot Group Effect

Comparison	Dependent Variables	Source of Predictions Equity Reinforcement	Results	H <sub>0</sub> :	Significance
$E_{nb} \text{ V } C_{nb}$	quantity of work	$E_{nb} < C_{nb}$	$E_{nb} = C_{nb}$	$E_{nb} = C_{nb}$	no significant difference <sup>1</sup>
$E_{nb} \text{ V } C_{nb}$	quality of work	$E_{nb} < C_{nb}$	$E_{nb} = C_{nb}$	$E_{nb} = C_{nb}$	no significant difference <sup>1</sup>
$E_{nb} \text{ V } C_{nb}$	speculative productivity	$E_{nb} < C_{nb}$	$E_{nb} = C_{nb}$	$E_{nb} = C_{nb}$	no significant difference <sup>2</sup>
$E_{nb} \text{ V } C_{nb}$	attractiveness ratings	$E_{nb} < C_{nb}$	$E_{nb} < C_{nb}$	$E_{nb} = C_{nb}$	$p < .012^3$

<sup>1</sup>Mann-Whitney U Statistic, (Senter, 1965)<sup>2</sup>Wilcoxon Matched Pairs Signed Ranks T-test, (Klugh, 1970)<sup>3</sup>Sign Test, (Klugh, 1970)

Table 4

## Cell Size

Group	Original N	Subjects Dropped Due To Manipulation Check	Actual N	Cell Sizes for Dependent Variables			
				qt.	ql.	s.p.	s.r.
E <sub>b</sub>	19	3	16	16	16	16	16
E <sub>nb</sub>	19	3	16	16	16	16	15*
C <sub>b</sub>	19	4	15	15	15	15	15
C <sub>nb</sub>	17	1	16	16	16	16	14*
	74	11	63	63	63	63	60*

\* Attractiveness ranking data were dropped due to the use of an improper ranking format. Subject's data for remaining dependent variables was retained.