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**Effects of Wage Equity and Inequity
on Job Performance and
Job Satisfaction**

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EFFECTS OF WAGE INEQUITY
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AND JOB SATISFACTION

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Background

Efforts to understand the intensity and direction of employee job behavior have been aided in recent years by several motivation theories or models (Vroom, 1964; Adams, 1963, 1965; Porter & Lawler, 1968). Vroom's Instrumentality-Expectancy Theory (Vroom, 1964) states that volitional behavior (e.g. what job to take or how hard to work on a job) depends upon forces associated with different actions. The force impelling a person toward any particular action is a function of his expectancy that the action will or will not lead to various outcomes and the valences (positive or negative affect) he feels toward those outcomes.

Porter and Lawler (1968) elaborate Vroom's expectancy formulation with a model which seeks to spell out how nine attitudinal and behavioral components² interact in a work setting to affect different levels of job performance and job satisfaction.

In contrast with the expectancy framework emphasized by the Vroom and Porter and Lawler models, Adams (1963, 1965) emphasizes the potential behavioral and cognitive effects of social comparisons made by an employee between himself and relevant other persons. Adams borrows from expectancy theory in postulating that an employee (Person) perceives what he gets from a job situation (Outcomes) in relation to what he must put into it (Inputs). However, Adams further postulates that the Person compares his own Outcome/Input ratio with the Outcome/Input ratios of relevant Others. If Person's and Other's ratios are perceived to be equal, a state of Equity is said to exist. However, if they are seen as unequal, Inequity is said to exist, its magnitude being a direct function of the amount of perceived discrepancy between the two ratios. If Person perceives his ratio as less than Other's, he experiences Under Reward; if he perceives his ratio as greater than Other's, he experiences Over Reward.

Regardless of the direction of the discrepancy, however, inequity is seen as aversive, and its presence leads to either behavioral or cognitive modes of reducing inequity; that is, an effort to equalize the two ratios. Person's modes of inequity reduction can include any or all of the following: (a) cognitively changing (distorting) either his own or Other's Inputs or Outcomes, (b) behaving in some way so as to induce Other to change his Inputs or Outcomes, (c) behaving in some way (for example, working harder) as to change his own Inputs or Outcomes, (d) choosing a different comparison Other (presumably one whose outcome/Input ratio is perceived as equal to his) or (e) leaving the field (i.e. removing one's self from the particular comparison situation, such as quitting the job).

2 The nine components include Effort, Performance, Satisfaction, Expectancy, Ability, Role Perception, Reward, Reward Value, and Perceived Equitable Reward.

In order to highlight the flavor of research generated by Adams' equity concepts, two studies are reviewed briefly below. They are followed with a broad overview of relevant findings drawn from two recent reviews (Lawler, 1968; Pritchard, 1969).

Adams and Rosenbaum (1962) tested some of the Over Reward deductions from equity theory. In their first experiment, subjects were paid a flat hourly rate and were made to feel either overpaid or equitably paid in relation to a hypothetical group of "qualified" interviewers. The argument was that the inequity generated by feeling Over Reward would lead to increased productivity because of efforts to increase Inputs, thereby decreasing the Outcome/Input ratio. The feelings of Over Reward were induced by suggesting that Person was not really qualified for the interviewing task (i.e. his Inputs were less than Other's) but that E would have to hire him anyway, and would have to pay him at the same rate as a "qualified" interviewer would be paid. The equitably paid Ss were simply told they were qualified and would be paid accordingly. The data supported the hypothesis in that the Over Reward Ss did conduct more interviews than their equitably paid counterparts.

In a second experiment, university students were hired for an interviewing job and assigned to one of four conditions; the first two comprised a replication of the first study. In the other conditions, Ss were paid on a piece-rate basis instead of a flat hourly rate. One group was made to feel over rewarded; the other equitably paid. For piece rate payment, predictions are somewhat more complicated. Ss rewarded on an hourly basis can simply increase their Inputs by conducting more interviews. This mode of inequity reduction is not available to Ss paid by the piece because if they conduct more interviews, they also get paid more, thereby increasing both their Inputs and their Outcomes. Adams and Rosenbaum, therefore, predicted that Ss, paid by the piece and made to feel over rewarded, would actually perform fewer interviews than Ss made to feel equitably paid. This prediction was confirmed by their results.

Lawler and O'Gara (1967) tested some of the Under Reward deductions from equity theory. After completing a job application, college student Ss were hired and told they would be paid 10¢ per interview (underpaid) or 25¢ per interview (equitably paid). Two measures of job performance were recorded: quantity--the number of interviews completed, and quality--the number of words per interview. The results supported equity theory in that the underpaid Ss conducted more interviews of lower quality than equitably paid Ss. Presumably the underpaid Ss felt that, relative to some Other, their Inputs were greater than their Outcomes, and they sought to reduce inequity by increasing their Outcomes without a corresponding increase in Inputs, i.e. by conducting more interviews but spending less time on each one.

Based on an extensive review of equity theory generated studies, Pritchard (1969) concludes that deductions regarding Under reward have generally been confirmed. For example, Homans (1953) and Patchen (1961) showed that perceived Under reward Outcome/Input ratios were associated with feelings of dissatisfaction. Three other studies (Clark, 1958; Lawler & O'Gara, 1967; Andrews, 1967) confirmed behavioral predictions flowing from conditions of Under reward.

Studies done to study Over Reward effects have been subject to methodological difficulties and cannot, therefore, be said to offer uniformly strong support for equity theory's deductions. Three major difficulties may be mentioned:

First, manipulations designed to induce feelings of overpayment have often taken the form of an implied attack on the S's qualifications with the possible further inference that their self esteem may thereby be threatened.³ Under such conditions, it seems likely that a subject will either believe himself to be less effective in the job or at least see that his new employer obviously believes he's not qualified. Thus, he may attempt to do an especially good job in order to convince either himself, his new employer, or both, that he really is more effective than he is believed to be. If paid at a flat hourly rate, doing a good job would probably take the form of producing more work. If paid on a piece rate basis, doing a good job is more likely to be expressed in terms of superior quality.

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- 3 For example, the overpayment manipulation in the Adams and Rosenbaum (1962) study was handled as follows: "You don't have any (nearly enough) experience in interviewing or survey work of the kind we're engaged in here. I specifically asked the Placement Service to refer only people with that kind of experience. This was the major qualification set. I can't understand how such a slip-up could have occurred... (agonizing pause)... Research in this area has shown that the nature of the response elicited by a skilled and experienced interviewer is more accurate and representative of the respondent's sentiments and differs substantially from the response elicited by inexperienced people.

Who interviewed you at Placement? (Tries to call Placement, gets a busy signal and slams the receiver down.) I guess I'll have to hire you anyway, but please pay close attention to the instructions I will give you. If anything I say seems complicated, don't hesitate to ask for clarification. If it seems simple, pay close attention. Some of this stuff, on the surface, may appear to be deceptively easy.

Since I'm going to hire you, I'll just have to pay you at the rate we advertised; that is, \$3.50 per hour (or 30¢ per interview for piece-rate conditions)." (Adams & Rosenbaum, 1962, p. 165)

A second difficulty in efforts to study Over reward has been that often the experimental manipulation has, indeed, placed special emphasis on quality of work and may have induced a special set in the direction of Ss exercising special care in their work. Ss made to feel overpaid by the typical approach of questioning their qualifications have been told to "pay close attention", "this is important to do this right", etc. Opsahl & Dunnette (1966) believe that such Ss will usually be led thereby to concentrate on doing high quality work, often at the expense of quantity.

A third problem, mentioned by Lawler (1968) is that Ss made to feel overpaid due to poor qualifications may also believe they are in danger of being fired, and thus seek to do especially good work to assure their job security. Lawler points out that this could take the form of increased quantity under an hourly pay system, and increased quality under piece-rate, since quantity and quality may be more salient under hourly and piece-rate systems, respectively. Arrowood, in trying to take account of this problem (1961) found that when Ss were made to feel that their supervisor would never see their work overpayment effects still occurred. Also, when Adams and Jacobsen (1964) told Ss that the job was to be a short one with no possibility of future work (thereby reducing job security as an issue), the predictive Over reward effects still were obtained.

The design employed by Andrews (1967) avoided the three problems just discussed. Here Ss overpaid by the piece produced the same quantity of work as the equitably paid Ss, and there is only marginal evidence that overpaid Ss produced higher quality work. In an unpublished study by Lawler (summarized by Lawler, 1968) Ss who were made to feel overpaid by implying they were unqualified produced more than the equitably paid group, but Ss made to feel overpaid "by circumstance" (thus avoiding any threat to self-esteem or job security) did not produce more than equitably paid Ss.

To summarize the literature, it seems that equity theory makes correct predictions in the case of underpayment. However, when potential contaminants have been controlled, evidence in favor of Over reward effects is limited, at best. At any rate, it is apparent that equity theory and deductions flowing from it needs further refining before its potential usefulness for understanding employee motivation can be fully realized. The purpose of the research described here was to refine the theory by avoiding some of the methodological difficulties discussed above.

In designing this experiment, therefore, we had a number of purposes or criteria in mind. These are outlined below:

- (1) First, it is necessary that perceptions of Over reward and Under reward be induced without reference to Ss qualifications for the job. We accomplished these inductions by telling Ss that someone in the company had made an error and that the wrong rates had been advertised.
- (2) Second, we wanted the setting to be seen by Ss as a real job situation. Awareness that the job was actually an experiment conducted by psychologists would induce demand characteristics which would be difficult to define or measure. Thus, elaborate precautions were taken to minimize any such demand properties and to provide a real job situation instead of the trappings of a psychological experiment.
- (3) We decided that the interpretive complexities attendant on using a task where both quality and quantity could vary are too great to afford a careful test of equity theory predictions. Thus, a task was invented where performance was measurable only by quantity; quality was not free to vary from 100% accuracy on all items produced.
- (4) In addition to using experimental manipulations of Over and Under reward conditions, we sought a method of inducing such feelings in vivo, so to speak, allowing them to appear as a natural consequence of policy actions taken by the company during the period of the experiment. This was done to lend another form of realism to our study.

Applicants for real jobs are rarely, if ever, told that they are under- or overpaid in comparison with others. However, as time on the job increases, various salary actions may automatically cause feelings of overpayment, underpayment, or equitable payment. This "naturally occurring" form of inequity is not a matter of deception by the personnel department. It is, instead, merely a fact of industrial life. We, therefore, took actions directed toward allowing feelings of naturally occurring equity and inequity to appear and to be investigated.

- (5) Equity theory is particularly in need of being tested according to temporal effects. In order to assess changes over time, we collected data from Ss who worked four hours per day on each of six consecutive work days.

Experimental Design and Hypotheses

Brief descriptions of the pay system and experimental design are necessary for understanding our hypotheses. Two pay methods were used, one, a straight hourly system, the other, an incentive system related to quantity of output. The hourly pay was \$2.00; pay on the incentive system was related to the number of units completed but not so directly as in a piece-rate system. Essentially, the incentive system allowed three different amounts of money to be earned for any given hour's work. As the chart below shows, three performance intervals were specified, each with its corresponding level of pay.

<u>Number of units completed within a particular hour</u>	<u>Pay for that particular hour</u>
16-22	\$1.60
23-29	\$2.00
30 or above	\$2.40

Thus, a subject completing between 16 and 22 units in a particular hour would receive \$1.60 for that hour; between 23 to 30, \$2.00 for that hour, and so on.

This interval incentive system was used in order to test equity predictions about how far into a pay interval a S would work. After brief experience with the task, Ss knew approximately how many units they could finish within any hour. Once a S knows this, he can choose when to stop working within an interval. Finishing 23 or 29 units both yield the same \$2.00 but doing 29 requires greater input. Thus, S can alter his inputs by the simple expedient of performing either high or low within any given pay interval. The theory predicts that Ss feeling over reward should work closer to the upper limit of each interval than those equitably paid and that Ss feeling under reward should be closest to the lower limit of each interval.

Each pay method utilized each of three equity conditions. That is, three groups (underpaid, equitably paid, and overpaid) started on the hourly pay system; and three groups, receiving similar equity manipulations, started on the interval pay system. After working for three days on the task, the pay systems for all groups were changed. The three groups on the hourly pay system were switched to the interval pay system, and the three groups on the interval pay system were

switched to straight hourly pay. Thus, one group of Ss who were led to believe they were underpaid worked for three days under the hourly pay system and were switched to the interval pay system for the last three days. The other group led to feel underpaid worked the first three days under the interval pay system and then worked three days under the hourly system. Likewise, there was an hourly-to-interval and an interval-to-hourly group, both of which had been led to believe they were equitably paid. Two analogous groups were led to feel overpaid. The rationale for this design is explained later.

Hypotheses tested in this study are divided into two areas: effects on (a) performance and (b) job satisfaction.

The predicted performance effects of Over reward may not occur in an industrial situation when the methodological problems discussed above are eliminated. This statement is based on a line of reasoning related to the type of exchange relationship typical for most industrial pay practices. Exchange relationships can be ordered according to the degree of psychological contact in the relationship (Pritchard, 1969). At one extreme is an intimate emotional relationship between two people. Less intimate would be two partners working in cooperation with each other; two co-workers (friends) in an exchange relationship with a third party, their employer; and finally, a worker and an unknown generalized comparison group (e.g. lathe operators in general) who are both in exchange relationships with employers. An important characteristic of this intimate-impersonal continuum is that changes or differences in Inputs or in Outcomes are much easier to perceive and may, therefore, be more salient at the intimate end than at the impersonal end. Furthermore, at the intimate end of the continuum, discrepancy between one person's Inputs and his Outcomes will directly lead to discrepancy between Inputs and Outcomes for the other person (assuming veridical perceptions), while at the impersonal end, since the outcomes of both partners in the relationship are determined by a third person (e.g. an employer), there is no necessary relation between one person's Outcome/Input ratio and the other person's Outcome/Input ratio. Assuming this greater sensitivity to differences in ratios as the relationship between two people is closer to the intimate end, and assuming there is less direct correspondence between the two people's ratios as the relationship moves toward the impersonal end, it should be less likely that Person will experience inequity relative to Other, the closer the relationship is to the impersonal end of the continuum. Aside from these direct determinants of inequity, it would seem easier to distort cognitively one's Inputs and Outcomes at the impersonal end, and thus decrease the chances that behavioral modes of inequity reduction would persist for very long.

Aside from this argument that inequity will be less likely to occur and easier to eliminate in an impersonal exchange relationship (e.g. an industrial compensation setting), there is another reason for expecting over-reward effects to be rarely discerned in industry. The basic assumption of equity theory is that if someone is being treated unjustly, forces are generated within the person to alleviate the situation. In a two-person, direct exchange relationship, if both parties have identical Inputs and Person is getting the lion's share of the common Outcomes, Other is being treated unjustly by Person. In this two-person situation Person, the controller of rewards, feels over-rewarded. The controller of rewards is a crucial point. Any cognitive or behavioral reactions to inequity must logically be directed at the controller of rewards since he is the "cause" of the unjust situation.

However, in most industrial situations, the company is usually seen as the controller of rewards. Person may react to underpayment with decreased effort, demands for more pay, or be generally addressing his attempts to achieve equity directly toward the company. In the case of over-reward, however, Person may indeed feel he is too highly paid relative to Other, but the cognitive and behavioral effects of this inequity should occur only if he somehow comes to believe that he is treating someone unfairly. However, the company obviously does not feel it is being taken advantage of or setting to few outcomes or it would lower Person's pay, fire him, or take some other action to increase its own Outcomes, increase Person's Inputs, etc. Thus, it seems likely that even if feelings of overpayment could be generated in Person, he would not behave in a way that could be construed as reducing feelings of overpayment. That is, he would not experience inequity.

Although this line of reasoning, and the lack of unambiguous research support for the over-reward portion of equity theory leads us to have grave doubts about predictions based on over-reward, we shall nonetheless state relevant hypotheses so that our results may be presented within the context of the theory and deductions from it.

Hourly Overpayment

H 1a. Ss made to feel overpaid on the hourly pay system will exhibit greater productivity than Ss who are equitably paid by the hour.

Interval Overpayment

In a task where quality does not vary, overpaid Ss on a piece-rate system have no obvious way of manipulating Inputs to reduce inequity.

Completing a large number of units yields a relatively large amount of pay. However, with the interval system, we can look at the number of units completed above the minimum of the performance interval into which a particular S's performance fell on a particular day and hour.

H 1b. Ss made to feel overpaid on the interval pay system will perform higher within the performance intervals than equitably-paid Ss on the same pay system.

Hourly Underpayment

H 2a. Ss made to feel underpaid on an hourly pay system will exhibit lower productivity than Ss equitably paid by the hour.

Interval Underpayment

H 2b. Ss who are made to feel underpaid on the interval system will perform lower within the performance intervals than equitably paid Ss on the same pay system.

Naturally-Occurring Inequity

Aside from these basic hypotheses generated by the theory, both of which have been dealt with by other research, several aspects of equity theory and methods of testing it have not been explored. In most of the published research, feelings of equity have been experimentally induced. While this may satisfy the requirement of testing the theory, the heuristic value of the theory for industrial compensation would be increased if it could be demonstrated that overpayment and underpayment effects result when they occur naturally. For example, if a person gets \$1.60 for producing 20 units in an hour on the interval pay system, and the pay system is changed so that he gets \$2.00 for the same 20 units, he should feel overpaid relative to his situation previously (if this change is not seen as being due to increased inputs, such as experience on the job). This is indeed what should occur when Ss are switched from the interval to the hourly pay system. Those Ss who have been consistently earning \$1.60 for their hourly 16-22 units suddenly get a \$.40 raise as a result of the shift to the flat rate of \$2.00 per hour. Thus, their outcomes are raised without a corresponding raise in inputs. This should result in feelings of overpayment.

In contrast, those Ss who have been consistently producing more than 30 units per hour for pay of \$2.40 will experience a decrease in pay when shifted to the flat rate of \$2.00 hourly. These Ss should experience under-payment. Those Ss who have been consistently producing 23 to 29 units per hour on the interval system get paid about the same after being shifted to the flat rate of \$2.00 hourly, and they should feel equitably paid.

Similar reasoning applies to shifts from the hourly to the interval pay system, for Ss in the equitably paid conditions. Ss who produce above 30 units on the \$2.00 hourly system get a raise to \$2.40 for the same inputs. This should result in feelings of Over reward. Feelings of Under reward should result for those Ss who have been low producers under the hourly pay because their pay will decrease from \$2.00 to \$1.60 for the same inputs. Equity should result for Ss who have been producing between 23 and 29 units per hour since there is no large net change in pay as a result of the shift to the interval system.

Aside from being more natural, this type of manipulation may help to overcome another complicating factor in the theory, namely the specification of the comparison object. The experimentally-induced manipulations generally refer to "people who have worked here before" or "people on jobs like this" in specifying the Other. While Ss may indeed use the pay given to these "other people" for comparison, one is not certain that they do. If, on the other hand, their own outcomes are changed as a result of an unexplained change in the pay system, it is very likely that they will use their own situation in the first pay system as a comparison object. Thus, one is more certain that feelings of inequity are generated since it is possible to more clearly specify the outcome/input ratio of Other. While it is, of course, possible that Person will not use himself as a comparison object, it at least seems quite likely that he will. Thus, equity theory would make the following predictions.

Natural Hourly Overpayment

H 3a. Ss who experience an increase in pay when switched from the interval to the hourly pay system will exhibit greater productivity than those Ss whose pay is unchanged as a result of the same shift.

Natural Interval Overpayment

H 3 b. Ss who experience an increase in pay when switched from the hourly to the interval pay system will perform higher in the performance intervals than Ss whose pay is unchanged as a result of the same shift.

Our a priori notions of the probability of these hypotheses being supported are not as low as for the "artificial" manipulation of over-payment. Recall that the two bases for expecting no overpayment effects in an industrial compensation situation are that since the exchange relationship is on the impersonal end of the intimate-impersonal continuum, there is no direct correspondence between changes in inputs or outcomes for the parties, and inputs and outcomes would

be easier to distort at the impersonal end. Second, even if S feels overpaid relative to his comparison object, the controller of rewards, the company, is not being treated unfairly since Person has not been fired nor has his pay been lowered.

Natural Hourly Underpayment

Underpayment was also naturally manipulated and the prediction was:

H 4a. Ss who experience a decrease in pay when shifted from the interval to the hourly pay system will exhibit lower productivity than those Ss whose pay is unchanged as a result of the same shift.

Natural Interval Underpayment

H 4b. Ss who experience a decrease in their pay when switched to the interval pay system will perform lower in the performance intervals than Ss whose pay is unchanged as a result of the same shift.

Effects Over Time

A tenet of equity theory which has received little attention is the effects of inequity over time. Adams (1965) points out that inequity is an aversive state and, via cognitive and behavioral modes of reduction, the aversive state will be eliminated. If the behavioral and cognitive effects of inequity dissipate in a very short time, the heuristic value of the theory for industrial compensation is decreased. Lawler et al. (1968) found that Ss who were overpaid on a piece-rate system changed their performance over three two-hour sessions. While the overpaid Ss produced less than equitably paid Ss during the first two-hour period, this difference did not occur in the second and third two-hour sessions. Thus, it appeared that while Ss originally reduced inequity by lowered quantity of production, this mode was not continued over time. Work quality, as determined by the number of words per interview, was also considered. While the overpaid Ss produced higher quality interviews during the first session, their quality was lower in later sessions.

One feature of their data that Lawler et al. do not discuss is that while the overpaid Ss showed a large drop in quality from the first session to the second, they also showed a rise in quality from the second session to the third. This seems to indicate that the overpaid Ss were still experiencing inequity. The data picture the overpaid Ss as initially producing relatively small amounts of high quality work, then sacrificing quality for the sake of more pay via increased quantity, and finally keeping both quantity and quality at a high level. One could argue that even in the third session the overpaid Ss were "working harder" than the equitably paid Ss.

Interval Overpayment Over Time

We have noted previously that the interval pay system allows for predictions regarding the place in the interval where a S's performance falls. We are assuming, based on the theory and the Lawler et al. results (1968), that Ss experiencing inequity will resort to less costly modes of inequity reduction. Performing high within the performance intervals may effectively reduce any feelings of inequity, but is a fairly costly mode of reduction in terms of effort. Thus, we might expect Ss who believe they are overpaid on the interval system to revert, over time, to less effortful modes of reduction, such as cognitive distortion of Inputs and/or Outcomes.

H 5a. The performance of overpaid Ss on the interval system will decrease within the performance levels over time relative to equitably paid Ss over the same time period and on the same pay system.

Hourly Overpayment Over Time

The same line of reasoning is the appropriate for hourly overpaid Ss. Continued high production is costly in terms of effort. Thus, we might expect performance to drop over time as less effortful modes of inequity reduction occur.

H db. The performance of overpaid Ss on the hourly pay system will decrease over time relative to equitably paid Ss over the same time period and the same pay system.

Hourly Underpayment Over Time

Hypotheses regarding the effects of underpayment over time are a bit more difficult to derive. In the case of hourly pay, feelings of underpayment inequity are reduced by lowered performance, but if Ss feel their low performance is justified, they may continue to perform at a low level. Subjects could also achieve equity by cognitively distorting their Inputs or Outcomes. However, if we assume that tension due to inequity may be reduced by behavioral modes, by cognitive modes, or by various ipsative combinations of the two, we should expect that any cognitive distortion should be accompanied by heightened productivity. Since this is a very effortful mode of inequity reduction, we would predict that performance would remain the same, relative to equitably paid Ss, or decrease. If hourly underpaid Ss are indeed low producers as the theory predicts, decreasing productivity over time relative to equitably paid Ss might be seen by the Ss as grounds for getting fired, a highly negative outcome. Thus,

- H 6a. The performance of Ss underpaid on an hourly basis will stay the same over time relative to equitably paid Ss over the same time period and on the same pay system.

Interval Underpayment Over Time

If Ss who are underpaid on the interval system do indeed perform at low levels within the intervals, we would have little reason to expect that this would change over time since increasing productivity is effortful in performing in a lower performance-pay interval.

- H 6b. The performance of Ss underpaid on the interval system will stay the same relative to equitably paid Ss over the time period on the same pay system.

Another area where equity theory needs exploration is the nature of the affective response to inequity. Adams (1965) postulates that inequity produces "tension"; anger in the case of under-reward, guilt for over-reward. It is a reasonable assumption to say that inequity will yield dissatisfaction, but again, this is not specific. Is the dissatisfaction with the comparison person? With the controller of rewards? With the whole situation? It seems possible that the dissatisfaction will be directed at the controller of rewards. It is the controller of rewards, the company, who is the "cause" of the underpayment or overpayment; thus, this tension or dissatisfaction should be manifested toward the company. It is also possible that this dissatisfaction generalizes to the whole job situation, and is manifested in the form of general dissatisfaction. In the case of underpayment, the hypotheses are fairly clear.

- H 7a. Relative to equitably paid Ss, underpaid Ss should exhibit more job dissatisfaction on items related to satisfaction with pay.

And, if the dissatisfaction does indeed generalize to the whole situation:

- H 7b. Relative to equitably paid Ss, underpaid Ss should exhibit more job dissatisfaction on items not related to pay.

Although less obvious, the theory might also predict greater dissatisfaction on the part of overpaid Ss. It is the controller of rewards, the company, who has put S in this situation of tension or guilt. Even though the company is giving him more pay than is equitable, it

is placing him in an aversive state. However, specifying which dimensions of job dissatisfaction will be affected is more difficult.

H 7c. Relative to equitably paid Ss, overpaid should exhibit more overall job dissatisfaction.

Method

Overview

The procedure consisted of hiring 253 male college students to work in a simulated company four and one-half hours for each of seven days. After one day of orientation, training, and a battery of tests, Ss were placed in one of six experimental conditions. Subjects were paid on either an hourly basis or a type of incentive system. Within these two pay systems Ss were made to feel overpaid, equitably paid, or underpaid.

After working on the job for three days, the Ss in each condition were shifted to a different pay system. The three groups on the hourly pay system were shifted to the incentive (interval) pay system. The three groups starting in the incentive (interval) system were shifted to the straight hourly system.

Performance and questionnaire data were collected throughout the seven-day period of employment.

Subjects

The subjects were male, undergraduate college students who answered advertisements for part-time, temporary employment over their Spring vacation. Because of the potential risk of subjects in different treatments interacting with each other, and the need for large numbers of subjects, several sites were set up in various cities in Minnesota. An attempt was made to recruit from schools with approximately the same student body population--students enrolled in the Minnesota state college system. All applicants who appeared were admitted to the first day's work except in the case of one condition, where, since enough Ss were present, the last three or four were turned away.

Task

Designing and pretesting required careful work. First, it had to be realistic since it was to be regarded as a real job. Second, for reasons mentioned previously, quality could not vary.

The task consisted of finding the prices of selected items in a mail order catalogue and indicating the correct price on a work sheet. Subjects were told that the simulated company, a manpower overload firm, had received a contract from a national department store chain which had just completed its annual catalogue sale. One unit or "block" of the task consisted of five items from this catalogue was presented on the work sheets in the following form. The designations in parentheses were not included in the actual computer output which constituted the task material.

(Identification number for the study-not used by <u>S</u>)	(Item Identifi- cation number)	(Page number in catalogue)
531	36A7213	321
428	4A21358	118
361	8N33321	216
212	89F62139	389
313	3A77115	32

(Prices)

19.95	18.99
1.89	1.99
324.99	339.95
24.99	25.88
4.95	3.95

To complete one block such as that above, Ss were to transform or "decode" the item identification number using a simple addition rule. If the first digit of the item identification number was 1, 2, or 3, the next five digits in the item identification were increased by one. If the first digit was 4, 5, or 6, the next five digits were increased by two, and three was added to the next five digits if the first digit was 7, 8, or 9. Thus, since the first digit of the item identification number for the first item (36A7213) is 3, the next five digits are increased by one, resulting in a decoded item identification number of 37A8324. Once these five item identification numbers were decoded, S turned to the page in the catalogue listed for that item, found it on the page, observed the sale price, circled the correct price from the five pairs of prices listed on the task material, and indicated which item the circled price corresponded to by writing a 1, 2, 3, 4, or 5 next to the circled price. Once all five items had been so completed, S went to the next block of five items and repeated the procedure.

It was explained to the Ss that these computer printout sheets were based on orders received by the department store for this catalogue

sale. However, they were told, since it was sale merchandise, different identification numbers were used for the products than in the regular, non-sale catalogues. This accounted for the necessity of decoding the identification numbers. It was mentioned that while most of this work was usually done by computer, the department store was currently experiencing a great deal of difficulty getting the system in operation. This delay had caused a backlog of unprocessed orders which had to be processed by hand. Ss were told that the department store chain had hired the manpower overload firm to do this work.

This kind of task should eliminate quality variance. A subject is forced to correctly transform the identification number if he is to find the correct price in the catalogue. Once the item is found in the catalogue, he merely circles the one correct price from the two printed on the sheet, and indicates the item to which it corresponds. Furthermore, since there were only five pairs of prices, one from each pair had to be circled when the block was finished. Thus, if S made an error on one item, it would become apparent to him when he could not find the correct price for another item in the block. No errors were found in the pre-test data nor in spot checks made during the study.

The blocks of five items were equated for difficulty level. The more items on a page in the sale catalogue, the more difficult one particular item should be to find. Each page of the catalogue was given a difficulty level score from 1 to 5 based on the number of items on that page, and one item from each difficulty level was included in each block of five items.

It was not feasible to generate enough unique blocks to insure that there were no duplications. Enough unique blocks were generated so that the average worker would complete the "item pool" in 6 to 8 hours. Thus, each S was actually working on the same items. Pilot studies indicated that Ss would not become aware of this duplication if each S started at a different point in the pool, thus minimizing the possibility of two people sitting next to each other working on exactly the same material. However, in the first real experimental group, which was equitably paid on the incentive system and then shifted to the hourly system, Ss did become aware that the material was repeating. As a consequence, this group, and all subsequent groups, were told that there was some duplicated material, but our "client" had requested us to complete everything and they would take care of separating the duplicates.

Pay System

When Ss worked under the hourly condition, they received a straight \$2.00 per hour. Under the incentive system, if a subject completed between 16 and 22 blocks of five items each in a given hour, he would receive \$1.60 for that hour; between 23 and 29 blocks, \$2.00;

and 30 or above, \$2.40. If he produced below 16, he received 8¢ per block. Pre-test data indicated that all Ss tested could produce 16 blocks or more after practice.

The pay rates were based on several considerations. The difference between the pay of the three performance intervals had to be large enough to be seen as worth working for, yet not so large as to make the fake pay rates used in the inequity manipulations seem unbelievably high or low. These fake pay rates were announced as being either higher or lower than the actual rates. It was felt that anything below \$1.35 or above \$3.00 per hour would seem unreasonable to the Ss. The actual hourly and middle interval rate of \$2.00 was based on what college students in the pilot studies felt was a fair rate for the task. The pilot studies also indicated that a difference of 30¢ to 40¢ between the intervals was more than sufficient to motivate Ss to try for the higher intervals since these pilot Ss did indeed strive for the higher intervals. Thus, using the base of \$2.00, the actual rates were set at \$1.60, \$2.00, and \$2.40 for the interval pay system, and \$2.00 for the hourly system. The performance intervals were also based on the pilot studies, and were set so as to maximize the chances that an equal number of Ss would fall into each interval.

Work Setting

Every attempt was made to make the work situation seem realistic. Subjects were told that the company operated as an overload manpower firm, taking contracts for clerical type work from companies who felt they did not have the facilities to get a job done. The company name was displayed on all advertisements for the job, and was printed on the checks Ss received. The company name also appeared on the printed time cards which were completed by the Ss every day. The task itself was made very realistic by using actual sale catalogues from a well-known national retail chain. The date given on the cover of the catalogue for the end of the sale coincided with the time of the study. The task material itself consisted of actual computer output. The experimenters were carefully trained and rehearsed, and were given a very detailed 26-page "manual" of instructions. This manual gave exact procedures to be followed and included a set of possible questions Ss might ask that a person working for a company should be able to immediately answer, e.g., "How long has the company been in business?". Each experimenter was thoroughly familiar with this manual.

Procedure and Design

Ss were recruited via flyers which were posted around the various campuses, placed in mailboxes, and left in piles near student newspaper outlets. Where possible, advertisements were also placed in student and local newspapers. The ads described the job, working hours, and listed the pay as \$2.00 per hour for groups in the hourly conditions, and "from \$1.00 to \$2.40 per hour depending on what you do" for the interval pay groups.

The six groups were treated identically until the end of the first day. When Ss reported to the site, they were met by a male and female experimenter, given a one-page description of the "company" and completed an application blank. When all had finished the application blank, the male experimenter (who was the "supervisor"; the female experimenter played the role of "secretary") introduced himself and his secretary, gave some background information about the firm and explained what the Ss would be doing for the rest of the day, and the subsequent six days. The subjects were told that the main contract was with the chain department store, but we also had another contract with Science Research Associates (SRA).⁴ They were told:

Science Research Associates (SRA) is a subsidiary of IBM. They sell tests to industry. They're developing a new set of tests of reactions to routine work. As You'll find out, this job is a good place for them to study such tests. We will be giving you these forms throughout the time you work for us. The SRA forms have nothing to do with whether you get hired. But we'll have to be sure you fill them all in to get our money from SRA.

This set was given to make the questionnaires given every day seem reasonable.

The first set of questionnaires was then passed out, and Ss were read a statement that "SRA has asked us to read". This statement pointed out that the Ss would fill out SRA questionnaires throughout the work period, they would be paid for this, they should read all directions carefully, answers wouldn't affect whether they would be hired, and social desirability in responding to questionnaires was explained and Ss were encouraged to avoid this tendency.

When this set of questionnaires had been completed, Ss were given three Short Employment Tests (SET): numerical, clerical, and vocabulary (Bennet & Gelink, 1956). These five-minute tests supposedly were to determine whether Ss had the aptitudes for the catalogue task. When the tests had been completed, the secretary left the room, reportedly to score the SET tests while E explained the catalogue task. Ss then completed one page of "practice material", and E made sure all Ss were doing the task properly. When all had finished the single sheet of four blocks, and after a short break, the rationale discussed above for the catalogue task was given. Ss were then told:

Now that you know how to do the job, we're going to have you work on it for one hour as a test of whether you can do it adequately. I'll give you several sheets of practice computer material. You are to work on this for the hour and do as much as you can. Your performance on this will be the biggest factor in deciding whether or not to hire you for the next week.

⁴ We would like to express our thanks to Science Research Associates for allowing us to use their name in this project.

This one hour work sample was instituted so that Ss would gain practice on the task. The SET and hour "test" were not actually used as selection instruments, but to insure high motivation, as well as to explain why they were given, the selection set was used. The tests and the job sample were intended to be perceived only as a screen for very low ability applicants so that the Ss would not feel overly qualified to do the job because they passed these tests. Thus, when the one-hour work sample was over, and before E began checking their work, Ss were told:

We can tell you now that we don't hire anyone who does less than five blocks in the hour period. So if you finished more than five, you're hired. Most of you should have made it. But we did have some people last week that just couldn't or wouldn't get into the swing of this job. So we set this very low cutoff point. Of course, you get some actual practice doing the job, and this will get you off to a good start on Monday. We'll check through these quickly and get back to you in about 10 minutes.

The cutoff of five blocks in the hour period was set from pre-test data, and no S produced below five in the actual experiment.

The first-day procedure was identical for all groups up to this point. However, at this point the groups who were to be in conditions of overpayment or underpayment received the information that something was wrong in the advertisements for the job. While both of them were in the room with the Ss, the secretary approached E with a copy of the advertisement and asked, "Did you see this?". E then looked at it and asked, "What about it?". She replied, "The pay!" E then looked at it again and displayed concern. They both left the room, and a few minutes later, E made a phone call, supposedly, to the "home office". This call was made within earshot of the Ss, and E confirmed on the phone that indeed the pay given in the ad was incorrect. Observation of the Ss behavior made it quite clear that they were attending to this conversation.

The purpose of this exchange was to set the stage for the inequity manipulations. At the end of the day, E told these groups that there was an error in the ad, and he could not give them the exact pay until he consulted with the "main office". It was felt that giving the actual manipulation at this point might result in a dissipation of any equity effects since the first performance and questionnaire measures would not be taken until two days later.

However, the method of payment was explained to them. They were paid for the two contracts separately. Pay for work done on the catalogue job would be given the morning following the day's work. Pay for the first day's introduction and testing, as well as all the money for the SRA contract (all of this at \$2.00 per hour) would be paid at the end of the last day. There were several reasons for this complex

method of payment. Paying the Ss every day was done so that it would be perfectly clear to them how their efforts were paying off on the catalogue job, especially the degree to which their performance led to money. Also, when the switch in pay system occurred, any change in amount of money earned would be very obvious. The first day's pay was held until the end to encourage Ss to keep coming back. The "SRA" money (approximately \$1.00 per day) was also held until the end so that the relative variability in pay would seem greater. A subject on the interval system could make up to \$9.00 in the four-hour work day, and would make \$6.40 if he were consistently in the lowest interval. If \$1.00 were added to this pay, the difference between lowest and highest pay would be the same, but since the absolute amounts were greater, the percentage range would be smaller. It was also felt that this additional \$1.00 might make the relationship between performance and rewards less obvious.

The number of units produced each hour and his pay for that hour were listed for each S on the back of his check. This was done so that Ss would have a clear idea of exactly how much they were putting into the job in terms of performance and their exact amount of financial outcomes.

When the Ss arrived for work two days later (the original data collection took place on a Saturday), E briefly reviewed the directions for the task, and explained that their finished work would be picked up each hour since E and the secretary had "to process it before it is sent out".

At this point, the equity manipulations were given.

Equity-Hourly

The Ss in this group (N=58) worked the first three days under this condition. They were simply told that the pay, as advertised, would be \$2.00 per hour, "the rate we have been paying college students for this work". They then started working on the catalogue task.

This group, and the two other groups (hourly underpaid and overpaid) whose first three days of work was under the hourly pay system, were given an additional "manipulation". Goodman and Friedman (1968) found that giving Ss production norms affected their performance. One could argue that Ss in the interval pay system had some idea of production norms since producing in the low, middle, or high interval might easily be seen as low, average, and good performance, respectively. To minimize the possibly contaminating effects of knowledge

of production norms, a sheet was placed in the work area of each hourly paid S which listed the three production intervals that were used for the interval system. The actual pay rates for the three intervals were not given, but it was indicated that different rates of pay were given by having "Pay Rate D (or F or H)" noted by each performance interval. Observation indicated that the Ss attended quite carefully to these sheets. As E began reviewing the directions for the task, he "noticed" that the sheets had been passed out, and told the Ss that they would not be paid on this system.

Equity-Interval

Forty-eight Ss worked the first three days under this condition. They were told that their pay would depend on the amount of work done each hour. If less than 16 blocks were finished, the pay for that hour was 8¢ per block. Finishing between 16 and 22 blocks yielded \$1.60; 23-29, \$2.00; and 30 or more, \$2.40. They were told that these were the rates the company had been paying college students for this work.

Overpayment-Hourly

The Ss in this group (N=25) were told:

There was a mistake in the flyer that you saw. The pay rate for the catalogue job is supposed to be \$1.65 an hour. This is the rate we have been paying college students like you in the past few weeks we have worked on this contract. The \$2.00 rate is much too high for this job. I checked with the main office, and since it was our mistake, we decided we would have to pay you at the higher rate of \$2.00 per hour, even though we normally pay college students \$1.65.

Overpayment-Interval

This group of 18 Ss was given essentially the same manipulation as the previous overpayment-hourly group, but were told that the "fair" pay rates the company had been using with college students were \$1.35, \$1.65, and \$2.00 for the respective intervals, but the flyers were incorrect and they would be paid at the "too high" advertised rates of \$1.60, \$2.00, and \$2.40. In addition consisted of giving these Ss, as well as the other two groups in the interval condition, a written copy of the performance-pay intervals. It was felt that if the information were merely read to the Ss, they would not really assimilate it. For the overpaid-interval group, this mimeographed sheet gave the rates that were "supposed to be used for this job", that is, \$1.30, \$1.65, and \$2.00. Just before they were passed out,

E instructed the secretary to change them. Thus, the Ss received sheets that were "corrected" by hand in their presence.

Underpayment-Hourly

The 22 Ss in this condition were also told that there was a mistake in the flyer they had received. And that:

We have been paying college students like you \$2.50 per hour for this job. I checked with the main office, and it was felt that since you tacitly agreed to work for the low rate by coming here to work, we would pay you at the lower \$2.00 rate. This may seem a little unfair, but you did sort of agree to it by coming.

Underpayment-Interval

The manipulation here was essentially similar to the hourly underpayment group except that the 25 Ss were told that the usual pay figures were \$2.00, \$2.50, and \$3.00 for the three performance intervals rather than the \$1.60, \$2.00, and \$2.40 that were advertised. These Ss were also given hand-corrected sheets listing this information.

After the payment manipulation had been given, Ss began work on the catalogue task. They worked four hours each of six days, their output being collected at the end of each hour. At the end of the fourth hour each day, they were given a set of questionnaires, supposedly from the SRA contract.

The six payment conditions described above were employed for the first three actual working days on the job. The very first day, of course, had consisted of the ability tests, learning the job, and the one hour work sample. After three days actually working on the job, all groups were shifted to a different pay system for the final three days. All groups who started in the hourly condition were shifted to the interval condition, and all groups starting on the interval condition were shifted to hourly. The intervals, the amount of pay for each interval, and the hourly rate were the same as those used in the first three days. For example, the underpaid-interval group went to a straight \$2.00 per hour, while the underpaid-hourly group went to \$1.60, \$2.00, and \$2.40 for the three performance intervals.

These shifts were accomplished by simply telling the Ss, on the morning of the fourth day, that the main office had decided to change the pay system, and the new system was explained. No direct attempt was made to reinforce the inequity manipulations.

Results

Checks on the Manipulations

A four-item questionnaire was given each day to measure perceptions of equity. Table 1⁵ presents the ANOVA table for these data. Figure 1 shows the means of the six conditions on the total of the four items. This figure demonstrates that for the three groups starting on the hourly pay system and switching to the interval pay system (the abbreviation H-I is used for these groups) perceptions of equity were as intended. The group receiving the underpayment manipulation reported the most underpayment; the overpayment group, the least. The data are not quite so simple for the I-H groups (started on interval and switched to the hourly pay system). While the underpaid and equitably paid groups followed the intended pattern, the overpaid group reported feeling less equitably paid than the equity group. However, even an a priori contrast on this difference is far from significant ($p > .40$, $\eta^2 < .0$).

While these data offer some evidence that the overpayment manipulation did not "take the first day, another explanation is possible. The groups starting on the interval pay system were forced to work very hard the first day to get into the two upper pay intervals since they had not as yet had much experience with the task. While this probably explains why the I-H groups generally reported lower feelings of equity, it also has implications for the overpaid I-H group reporting relatively low feelings of equity. This group had been told that they were receiving more pay than they should have. However, in terms of actual earnings that first day, 11 out of the 18 Ss never got above the lowest interval, and 6 received \$1.20 or less for one or more of the four working hours. This combination of low earnings and being told they were receiving relatively high earnings may easily have resulted in low feelings of equity when the questionnaire was completed at the end of the day. There is some evidence supporting this interpretation in that after the first day, when performance and earnings were substantially higher, the overpaid I-H group actually did report higher feelings of equity than the equitably paid I-H group.

5 Estimates of the magnitude of the experimental effects are reported along with p values. These were calculated from a table presented by Friedman (1968), which, for the F statistic, gives an estimate of η^2 , the correlation ratio. η^2 squared may be interpreted as the percent of variance attributable to the experimental factor in question. The "greater than" and "less than" signs reported here are greater than .20 are preceded by "greater than" signs. These are to be interpreted as greater than the listed value, but less than the next .05 increment above the listed value. For example, $\eta^2 > .30$ is interpreted as greater than .30 but less than .35.

TABLE 1
Analysis of Variance on Sum of Four Equity Items,
First Day, All Groups

Source	df	MS	F	η^2
Equity Condition (A)	2	53.15	5.009*	> .21
Pay System (B)	1	132.61	12.497**	> .26
A x B	2	10.22	.964	< .20
Error	189	10.61		

* $p < .01$

** $p < .001$

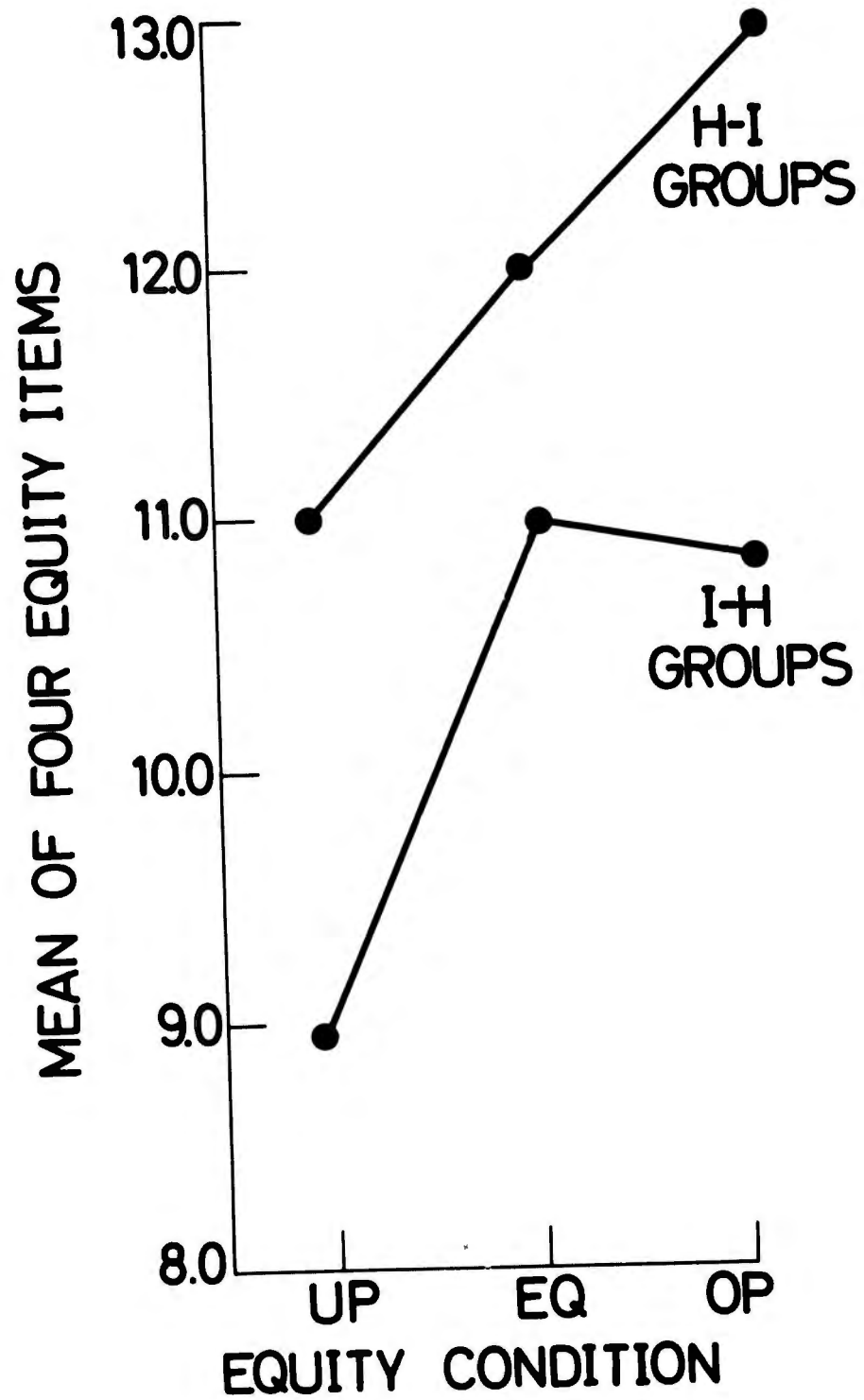


FIGURE 1. Sum of four items dealing with feelings of equity, first day, all groups.

Figure 1 also shows that all groups actually reported feelings of underpayment. The 7-point Likert items measuring perceptions of equity have 4 as their neutral or equity point. Greater than 4 is overpayment; less than 4, underpayment. Thus, a subject reporting that he felt equitably paid on all 4 items would receive a score of 16. The means of all the groups are substantially below 16.0. Subjects seemed very unwilling to report feelings of overpayment or even equity. Pilot Ss questioned about this reported that it did not seem wise to report overpayment since they felt their employers might lower their pay. Ss in the pilot studies, who received the same overpayment manipulation, reported that they felt overpaid when they were questioned verbally. Thus, it seems possible that overpayment was indeed generated, but that subjects distorted their responses on the questionnaires downward to avoid possible "intimidation" by their employer.

Performance: Experimental Manipulation of Inequity

- H 1a. Ss made to feel overpaid on the hourly pay system will exhibit greater productivity than Ss who are equitably paid by the hour.
- H 2a. Ss made to feel underpaid on the hourly pay system will exhibit lower productivity than Ss equitably paid by the hour.

Figure 2 shows the mean hourly performance for the three H-I groups over the three days on the hourly pay system. While the means fall in the predicted pattern, the overall F-test fails to reach commonly accepted levels of significance ($F = 2.52$; $df = 2, 95$; $p = .085$, $\eta^2 < .20$). More importantly, a priori contrasts fail to reliably support either hypothesis. The p value for the difference between the overpayment ($N=22$) mean and the equitably paid group mean ($N=55$) is approximately .18, $\eta^2 < .20$; underpayment ($N=21$) vs. equitably paid, approximately .15, $\eta^2 < .20$. Means from the first day's performance show a similar pattern as for all three days; however, the difference between underpayment and equitable payment is slightly larger ($p = .10$, $\eta^2 < .20$).

These data do not strongly support either hypothesis; however, the underpayment effects appear slightly larger.

- H 1b. Ss made to feel overpaid on the interval pay system will perform higher within the performance intervals than equitably paid Ss on the same pay system.
- H 2b. Ss made to feel underpaid on the interval system will perform lower within the performance intervals than equitably paid Ss on the same system.

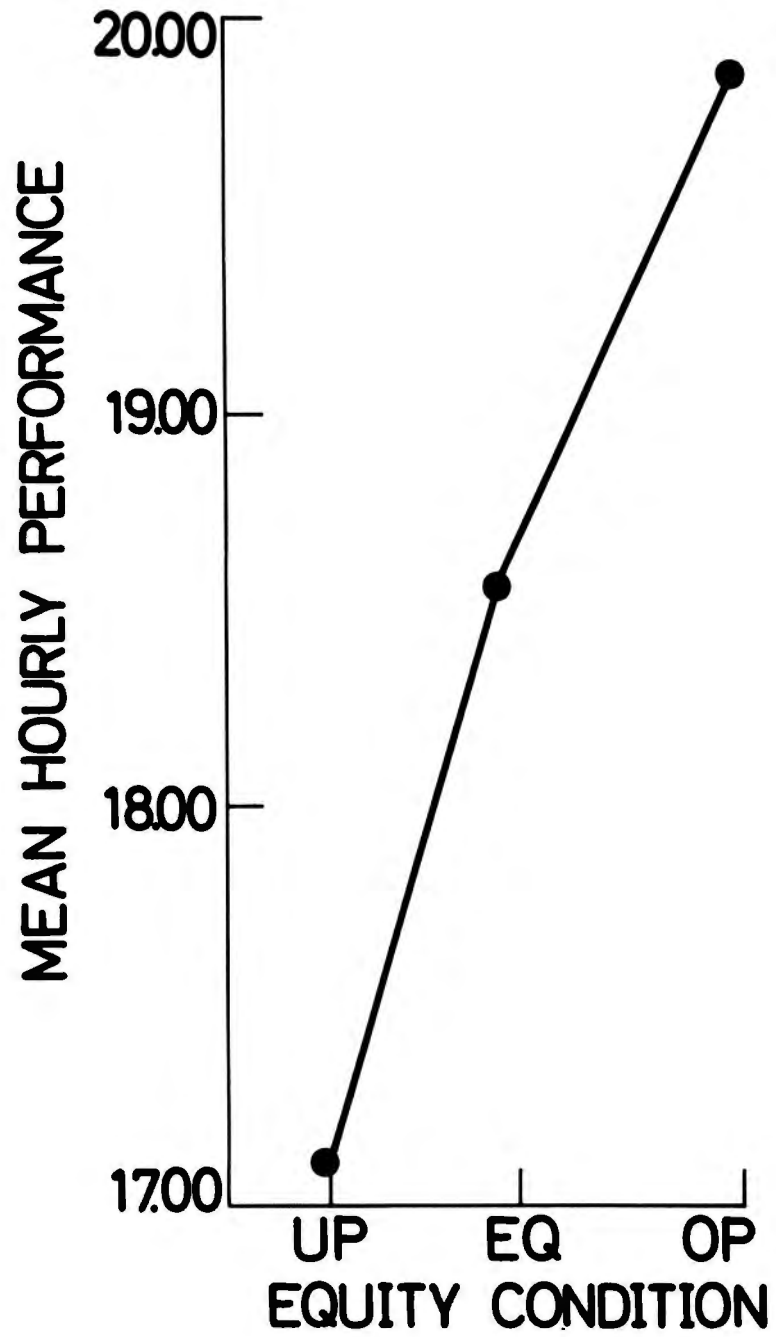


FIGURE 2. Mean hourly performance for the three days under the hourly pay system; H-I groups.

The data for these hypotheses are presented in Figure 3. They offer no support for the predictions since the means are not significantly different from each other ($F = .43$; $df = 2, 83$; $p = .65$; $\eta^2 < .20$) and are directly opposite to the predicted pattern. (N's = 23, 45, and 18 for underpayment, equitable payment, and overpayment, respectively.)

Results for the first day's performance are similar in pattern, and show larger differences between the three groups in a direction opposite the predictions ($p = .058$; $\eta^2 < .25$).

Performance: Naturally-occurring Inequity

The hypotheses dealing with naturally-occurring inequity consider the effects on performance resulting from a change in pay without a corresponding change in productivity. For example, a high producer on the hourly system who is switched to interval should experience overpayment since he is getting more money for the same amount of work. The testing of these hypotheses requires that the Ss be divided into high, middle, and low producers. To accomplish this, the third day's work (the last day before the shift) was considered. If a subject's performance for three or four hours of the third day placed him in the upper interval, he was classified as a high performer. If he performed in the upper interval for two hours, i.e. half the time, and in the middle interval for the other two hours, his performance for the second day's work was considered and he was placed in that category in which he performed most frequently for both days. Similar decision rules were used for classifying Ss into middle and low performers. Using the third day's performance figures presumably best reflected his Outcome/Input ratio before the shift. It was not only temporally close to the post-shift period, but was the most accurate indicator of his level of performance.

H 3 a. Ss who experience an increase in pay when switched to the hourly pay system will exhibit greater productivity than those Ss whose pay is unchanged as a result of the same shift.

H 4 a. Ss who experience a decrease in their pay when switched to the hourly pay system will exhibit lower productivity than those Ss whose pay is unchanged as a result of the same shift.

Data relevant to these hypotheses are presented in Figure 4. The complete analysis was conducted with high, middle, and low performance levels considered within each equity condition. This was done to explore any differences in the performance level over time effects for different experimentally-induced inequity conditions, i.e. a three-way interaction. As Table 2 indicates, no such interaction occurred ($F = 1.26$) and, for the sake of clarity, the graph in Figure 4 is summed over the three experimentally-induced inequity conditions.

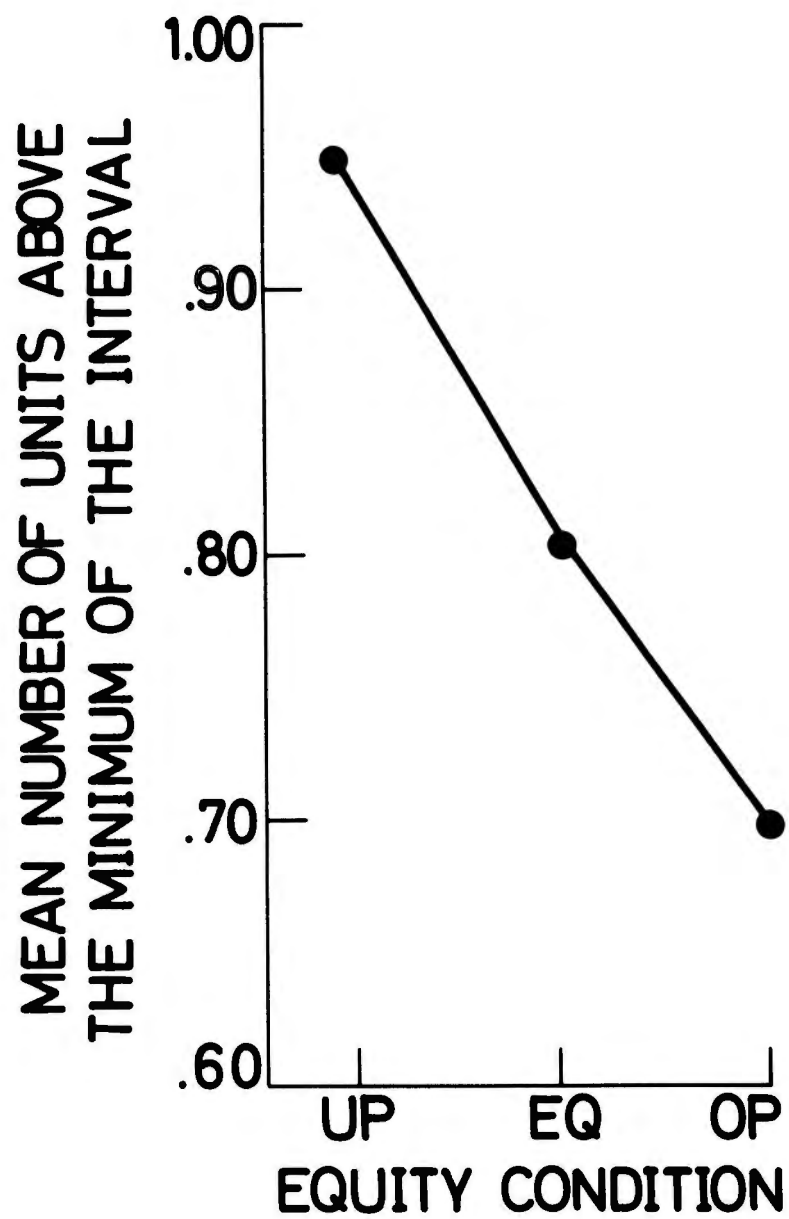


FIGURE 3. Mean number of units above the minimum of the interval for the three days under the interval pay system; I-H groups.

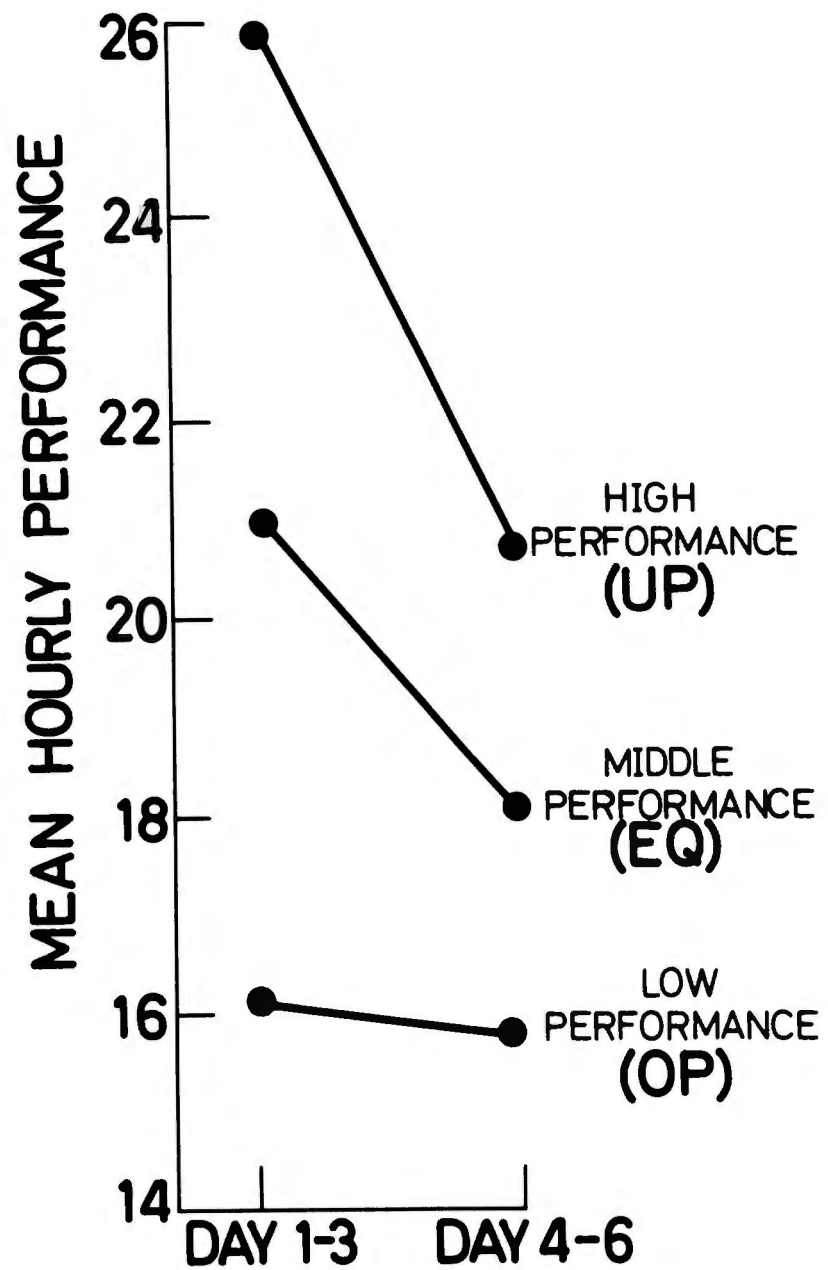


FIGURE 4. Mean hourly performance for days 1-3 to days 4-6 by performance level.

TABLE 2
Analysis of Variance on Mean Hourly Performance from
Days 1-3 to Days 4-6 for High, Middle, and Low Performers

Source	df	MS	F	eta
Performance Level (A)	2	559.11	68.41*	> .80
Equity Condition (B)	2	78.26	9.57*	> .45
A x B	4	7.20	.88	< .20
Error (between)	72	8.17		
Days (C)	1	265.06	52.17*	> .65
C x A	2	40.84	8.04*	> .40
C x B	2	5.56	1.10	< .20
C x A x B	4	6.38	1.26	< .20
Error (within)	72	5.08		

* $p < .001$

The pattern of results is as predicted. The low performers (N=15) on the interval condition (Days 1-3) when switched to the hourly system receive a raise of \$.40 per hour for the same performance. They should thus feel overpaid. The prediction is that the low performers should decrease less than the middle performers (N=43), who receive no change in pay. Conversely, the high performers (N=24) receive a decrease in pay and show, as predicted, a larger drop in performance than the middle performers. As the complete ANOVA table in Table 2 indicates, the interaction between Day and Performance Level, the joint test of these two hypotheses, is highly significant ($p < .0005$, $\eta^2 > .40$).

One might argue that since the naturally overpaid group did not actually increase their performance, the predictions from equity theory are not supported. However, as discussed subsequently, the two pay systems represent two levels of expectancy (Vroom, 1964; Porter & Lawler, 1968), that is, the expectancy that increased performance will result in increased pay. Expectancy theories predict that the switch from the interval to the hourly pay system will result in decreased performance. This is indeed what occurred. By stating that the predictions made by equity theory are supported by these data, we are essentially arguing that both expectancy and equity effects are operating, and equity effects (differential amounts of performance decrease) are operating in the context of expectancy effects (overall decreased performance).

H 3b. Ss who experience an increase in pay when switched to the interval pay system will perform higher in the performance intervals than Ss whose pay is unchanged as a result of the same shift.

H 4b. Ss who experience a decrease in pay when switched to the interval pay system will perform lower in the performance intervals than Ss whose pay is unchanged as a result of the same shift.

These hypotheses deal with the H-I groups. Although the rationale for under- and overpayment is the same as for the I-H groups, the high H-I performers should experience overpayment since they essentially get a raise, while the low H-I performers should experience underpayment following their decrease in pay.

The analysis for testing these hypotheses does not require the repeated measures design employed in the two previous hypotheses. Since the number of units above the minimum of the interval is independent of performance interval, no comparison with the first three days' performance is necessary; nor is it meaningful since these H-I groups were not under that pay system.

The analysis for testing these hypotheses is presented in Table 3. Here again, for the sake of clarity, the graph of the means (Figure 5) is collapsed over the three equity conditions. As Figure 5 shows, the overpayment hypothesis seems to be supported since the high performers (N=5) were higher in the pay intervals than the middle performers (N=29). A contrast on this difference is highly significant ($p < .0005$, $\eta^2 > .38$). However, the underpayment hypothesis is not supported. The low performers (N=67), the naturally underpaid group, were slightly higher within the intervals than the middle performers.

Performance: Effects Over Time

- H 5b. The performance of overpaid Ss on the hourly pay system will decrease over time relative to equitably paid Ss over the same time period and the same pay system.
- H 6a. The performance of Ss underpaid on the hourly basis will stay the same over time relative to equitably paid Ss over the same time period and on the same pay system.

These hypotheses deal with the first three days' work--under experimentally induced inequity. Mean performance data are presented in Table 4. Compared to the equitably paid group, the overpaid group did not increase its performance as predicted. The underpaid group actually decreased relative to the equitably paid group, but the Day 3 difference is not significantly larger than the Day 1 difference ($p > .20$, $\eta^2 < .20$). This offers at least some support for the underpayment hypothesis of no change.

It is also informative to test these two hypotheses with the data on naturally-occurring inequity, namely the last three days' work. Table 5 shows the changes over time of the high, middle, and low performers from the equity I-H groups. Here again, as with the naturally-occurring performance effects considered previously, absolute level of performance is not crucial, rather the changes over time relative to the middle performers.

These results show that while the naturally overpaid (low performers) did decrease their productivity over time relative to the middle performers, this difference was not significant ($p < .40$, $\eta^2 < .20$).

The naturally underpaid group (high performers) decreased relative to the middle performers. The Day 6 difference contrasted with the Day 3 difference yields a p value less than .08, $\eta^2 > .20$. Neither hypothesis is supported by these data.

TABLE 3

Analysis of Variance on Mean Number of Units Above the
Minimum of the Interval, Last Three Days, H-I Groups

Source	df	MS	F	eta
Equity Condition (A)	2	1.49	.91	< .20
Performance Level (B)	2	12.74	7.80*	> .38
A x B	4	.77	.47	< .20
Error	92	1.633		

* $p < .001$

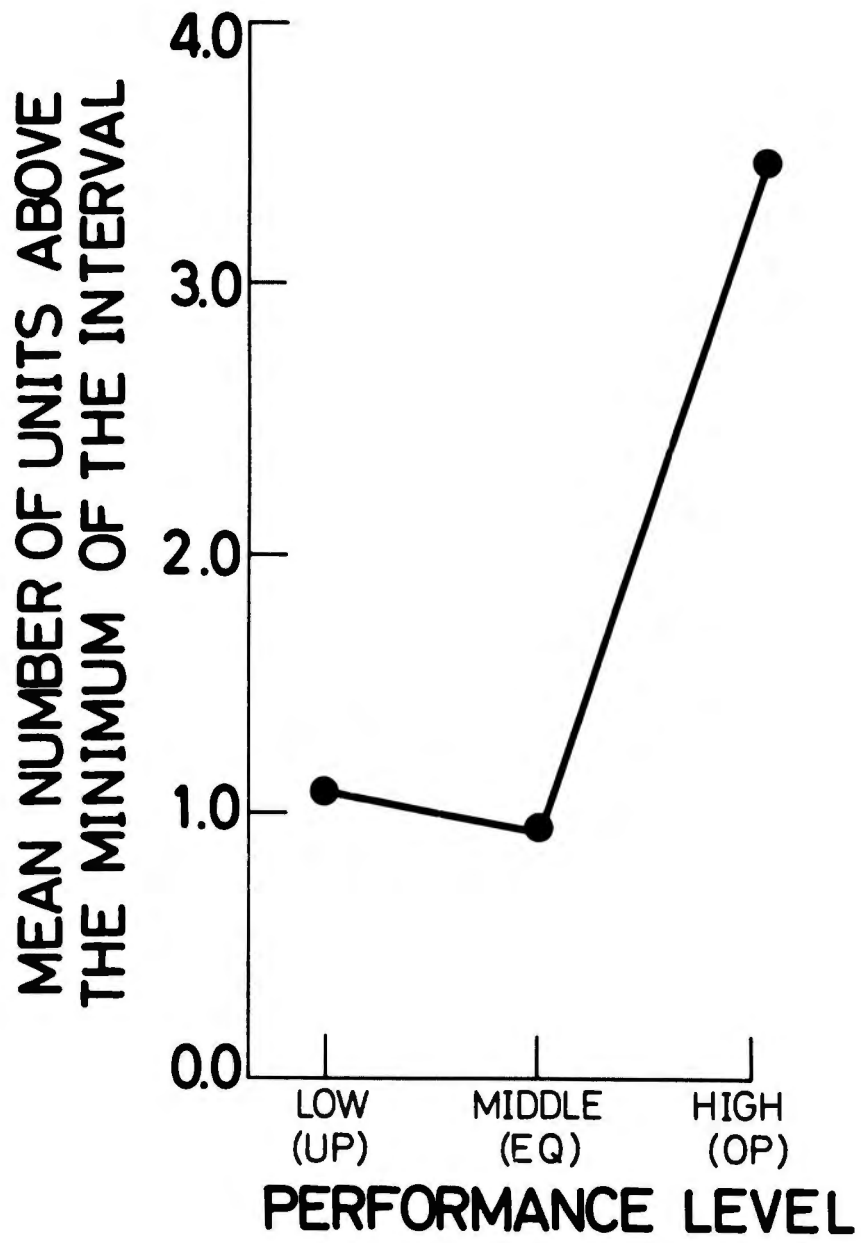


FIGURE 5. Mean number of units above the minimum of the interval for the last three days; II-I groups.

TABLE 4

Mean Hourly Performance for Days 1, 2, and 3, H-I Groups

<u>Treatment Group</u>	<u>Time</u>		
	<u>Day 1</u>	<u>Day 2</u>	<u>Day 3</u>
Underpaid (N = 21)	14.95	18.11	18.37
Equitably paid (N = 57)	16.40	19.40	20.82
Overpaid (N = 21)	16.94	20.18	21.44

TABLE 5
Mean Hourly Performance for Days 4, 5, and 6
for High, Middle, and Low Performers, I-H Groups

<u>Group</u>	<u>Time</u>		
	<u>Day 4</u>	<u>Day 5</u>	<u>Day 6</u>
(UP) High Performers (N = 12)	23.67	20.94	16.50
(EQ) Middle Performers (N = 21)	20.13	18.40	19.55
(OP) Low Performers (N = 5)	17.55	15.90	12.95

- H 5a. The performance of overpaid \bar{S}_s on the interval system will decrease within the performance intervals over time relative to equitably paid \bar{S}_s over the same time period and on the same pay system.
- H 6b. The performance of \bar{S}_s underpaid on the interval system will stay the same relative to the equitably paid \bar{S}_s over the same time period on the same pay system.

Table 6 shows that the overpayment hypothesis is not supported. Relative to the equitably paid \bar{S}_s , the overpaid \bar{S}_s actually increased the number of units above the minimum of the interval; however, this change is not significant ($p < .40$, $\eta^2 > .20$). The underpaid \bar{S}_s decreased relative to the equitably paid group; the change is significant at less than the .01 level, $\eta^2 > .20$. The underpayment hypothesis of no change is not supported.

Looking at the results for naturally occurring inequity over time, Table 7 indicates, as do the statistical tests on these data, that neither the naturally overpaid (high performers) nor the naturally underpaid (low performers) showed any differential change over time relative to the naturally equitably paid group.

Summary of the Results Relevant to the Performance Hypotheses

1. Experimentally-induced inequity did not result in the predicted performance effects for the interval pay systems. However, there is some evidence that hourly underpayment and overpayment effects occurred, but the effects are not statistically significant.
2. Naturally-occurring inequity supported the predictions for the hourly pay system. \bar{S}_s experiencing overpayment decreased performance less than equitably paid \bar{S}_s who decreased less than underpaid \bar{S}_s . On the interval system, the overpayment prediction appears to be supported in that the high producers produced higher in the intervals than the middle performers, but the naturally underpaid \bar{S}_s were not lower in the intervals than the middle producers.
3. While the results for the predictions over time did not support the hypothesis, a fairly consistent trend appeared. The underpaid \bar{S}_s , both experimentally and naturally induced, tended to decrease their inputs over time relative to the overpaid group, while the overpaid groups tended to parallel the equitably paid groups over time.

TABLE 6

Mean Hourly Number of Units Above the Minimum of
the Interval for Days 1, 2, and 3; I-H Groups

Treatment Group	Time		
	Day 1	Day 2	Day 3
Underpaid (N = 22)	2.19	.60	.28
Equitably paid (N = 40)	1.61	.63	.36
Overpaid (N = 14)	1.46	.82	.48

TABLE 7

Mean Hourly Number of Units Above the Minimum of
the Interval for Days 4, 5, and 6; H-I Groups

Group	Time		
	Day 4	Day 5	Day 6
(UP) Low Performers (N = 27)	.95	.44	.54
(EQ) Middle Performers (N = 19)	.88	.58	.53
(OP) High Performers (N = 2)	3.50	4.13	3.38

Satisfaction Hypotheses: Pay

H 7a. Relative to equitably paid Ss, underpaid Ss should exhibit more job dissatisfaction on items related to satisfaction with pay.

Two measures of job satisfaction were employed. Thirteen items from the MSQ (Minnesota Satisfaction Questionnaire, Weiss et al., 1967) were selected on the basis of their relevance for this job. These 13 seven-point Likert items covered such areas as pay, making use of abilities, recognition, and working conditions. The JDI (Job Description Index, Smith, 1967) constituted the other measure. This instrument gives scores on five dimensions: Work, Supervision, People, Pay, and Promotions.

Although no specific hypothesis could be made regarding satisfaction with pay by overpaid Ss, Table 8 shows data relevant to these groups, as well as the underpaid groups, for the MSQ item related to pay, given on the first day. The ANOVA table for these data appears in Table 9.

These data support hypothesis 7a in that the underpaid Ss exhibit more job dissatisfaction about pay than equitably paid Ss. The contrast of the underpayment with the equitably paid groups yields a p value of less than .0005, $\eta^2 > .25$. The overpaid groups were not appreciably nor significantly different from the equitably paid groups ($p < .60$, $\eta^2 < .20$).

Means from the JDI scale related to pay are presented in Table 10. The ANOVA table for these data also appears in Table 9. Because of the method of scoring the JDI, the higher the scores, the greater the dissatisfaction.

These data do not support the hypothesis in that the underpaid groups are not significantly different from the equitably paid groups ($p < .80$, $\eta^2 < .20$). There is also no difference for the overpaid groups ($p < .50$, $\eta^2 < .20$).

This hypothesis may also be evaluated by consideration of naturally-occurring inequity. Table 11 presents the MSQ pay item for the fourth day, the first day of the naturally-occurring inequity (ANOVA table, Table 9). As before, the low H-I performers, and the high I-H performers are the naturally underpaid groups, while the high H-I and low I-H form the overpaid groups. Due to small sample size, the high, middle, and low performers from only the two equity groups are used in the analysis.

TABLE 8
Mean Satisfaction with Pay (MSQ),
Day 1, Experimentally-induced Inequity

<u>Pay System</u>	<u>Equity Condition</u>		
	<u>UP</u>	<u>EQ</u>	<u>OP</u>
Hourly	2.95 (N=19)	3.50 (N=58)	3.52 (N=25)
Interval	2.20 (N=25)	2.75 (N=48)	2.89 (N=18)

TABLE 9

Analysis of Variance on Mean Satisfaction with Pay

Dependent Variable	ANOVA Table				
	Source	df	MS	F	eta
Mean satisfaction with pay (MSQ), Day 1, experimentally- induced inequity.	Equity Condition (A)	2	5.62	6.02**	>.25
	Pay System (B)	1	24.86	26.64**	>.50
	A x B	2	.06	.06	<.20
	Error	187	.93		
Mean satisfaction with Pay (JDI), Day 1, experimentally- induced inequity.	A	2	3.61	.18	<.20
	B	1	131.26	6.40*	>.20
	A x B	2	3.90	1.90	<.20
	Error	189	20.50		
Mean satisfaction with pay (MSQ), Day 4, naturally- occurring inequity.	A	2	7.36	6.50**	>.35
	B	1	10.38	9.17**	>.30
	A x B	2	1.62	1.43	<.20
	Error	77	1.13		
Mean satisfaction with Pay (JDI), Day 4, naturally- occurring inequity.	A	2	73.18	3.89*	>.30
	B	1	61.11	3.25	>.20
	A x B	2	7.79	.41	<.20
	Error	76	18.81		

* $p < .05$ ** $p < .003$

TABLE 10
Mean Satisfaction with Pay (JDI),
Day 1, Experimentally-induced Inequity

<u>Pay System</u>	<u>Equity Condition</u>		
	<u>UP</u>	<u>EQ</u>	<u>OP</u>
Hourly	11.86	12.37	12.24
	(N=21)	(N=58)	(N=25)
Interval	13.96	14.11	13.18
	(N=25)	(N=48)	(N=18)

Note: The larger the number, the greater the dissatisfaction.

TABLE 11
Mean Satisfaction with Pay (MSQ),
Day 4, Naturally-occurring Inequity

<u>Pay System</u>	<u>Equity Condition</u>		
	<u>UP (nat.)</u>	<u>EQ (nat.)</u>	<u>OP (nat.)</u>
Hourly	3.30	3.39	3.67
	(N=10)	(N=23)	(N=3)
Interval	2.04	3.00	3.00
	(N=26)	(N=19)	(N=2)

The results in Table 11 confirm the hypothesis; the naturally underpaid groups show greater dissatisfaction with pay. Contrasting the naturally underpaid with the naturally equitably paid groups yields a highly significant difference ($p < .005$, $\eta^2 > .35$). Furthermore, the naturally overpaid groups are not appreciably nor significantly more satisfied with pay than the naturally equitably paid groups ($p < .50$, $\eta^2 < .20$).

The same analysis conducted with the JDI pay scale is presented in Table 9, the means in Table 12. These data offer more support for the hypothesis in that the naturally underpaid groups are more dissatisfied with pay than the naturally equitably paid S_s . A contrast on this difference approaches the accepted level of statistical significance ($p < .12$, $\eta^2 > .20$). The naturally overpaid groups show greater satisfaction with pay than the equitably paid groups; here again, the contrast is only marginally significant ($p < .12$, $\eta^2 > .20$).

Satisfaction Hypotheses: Overall Satisfaction

H 7b. Relative to equitably paid S_s , underpaid S_s should exhibit more job dissatisfaction on items not related to pay.

H 7c. Relative to equitably paid S_s , overpaid S_s should exhibit more overall job dissatisfaction.

Data relevant to these hypotheses for experimentally-induced inequity are presented in Figure 6, Table 13, and Table 14. Figure 6 presents the total MSQ satisfaction score for Day 1. The item related to pay is included in the total score, but inspection of the results for the individual items indicates that the conclusions would be identical if it were excluded. Furthermore, its inclusion is necessary for testing the overpayment hypothesis.

As Table 15 indicates, the results support the underpayment hypothesis in that the underpaid groups are more dissatisfied than the equitably paid S_s ($p < .001$, $\eta^2 > .25$). Some support is given to the overpayment hypothesis since the pattern of means is as predicted, the difference being marginally significant ($p < .08$, $\eta^2 < .20$). The ANOVA table for these data appears in Table 13.

The means for the JDI scales are presented in Table 14. ANOVA tables appear in Table 13. While all the differences are not statistically significant, the patterns of means support both the underpayment and overpayment hypotheses for the I-H groups. The hypotheses are not completely supported by the H-I groups. Contrasts, associated p values, and η^2 s for these data appear in Table 15. Where similar trends occurred, the contrast used the mean of both, e.g., naturally underpaid groups. Where the direction of the deviation from the equitably paid groups was different, the two (e.g. underpaid) groups were contrasted separately with their respective equitably paid groups.

TABLE 12
Mean Satisfaction with Pay (JDI),
Day 4, Naturally-occurring Inequity

<u>Pay System</u>	<u>Equity Condition</u>		
	<u>UP (nat.)</u>	<u>EQ (nat.)</u>	<u>OP (nat.)</u>
Hourly	13.00 (N=12)	12.71 (N=21)	8.67 (N=3)
Interval	15.76 (N=25)	13.63 (N=19)	11.00 (N=2)

Note: The larger the number, the greater the dissatisfaction.

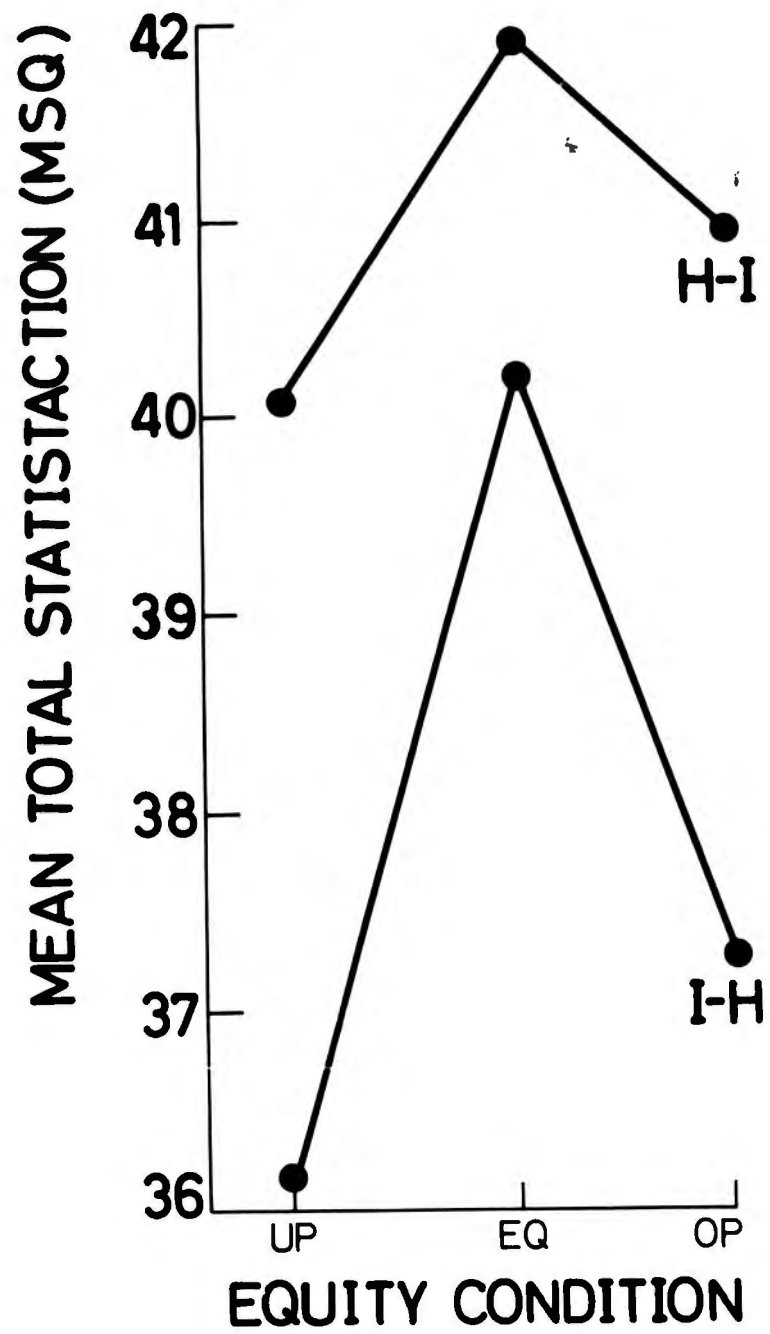


FIGURE 6. Mean total satisfaction (MSQ), day 1, experimentally-induced inequity.

TABLE 13
Analysis of Variance on Overall Satisfaction,
Day 1, Experimentally-induced Inequity

Dependent Variable	ANOVA Table				
	Source	df	MS	F	eta
MSQ total satisfaction	Equity Condition (A)	2	139.92	5.64**	>.22
	Pay System (B)	1	326.51	13.16**	>.26
	A x B	2	31.79	1.28	<.20
	Error	189	24.81		
JDI Work	A	2	13.22	.44	<.20
	B	1	793.57	26.46**	>.30
	A x B	2	140.94	4.70*	>.20
	Error	189	29.99		
JDI Supervision	A	2	7.30	.31	<.20
	B	1	78.14	3.31	<.20
	A x B	2	42.28	1.79	<.20
	Error	189	23.61		
JDI People	A	2	65.30	1.84	<.20
	B	1	577.95	16.28*	>.30
	A x B	2	46.55	1.31	<.20
	Error	189	35.50		
JDI Promotions	A	2	34.54	2.42	<.20
	B	1	27.05	1.90	<.20
	A x B	2	51.55	3.61*	>.20
	Error	189	14.27		

* p < .03; ** p < .005

TABLE 14

**Mean Satisfaction, Day 1,
Experimentally-induced Inequity**

Scale	Pay System	Equity Condition		
		UP	EQ	OP
JDI Work	Hourly	23.52	26.53	26.76
	Interval	31.70	28.83	30.59
JDI Supervision	Hourly	16.48	17.03	15.72
	Interval	18.89	17.11	18.77
JDI People	Hourly	15.14	13.81	11.72
	Interval	18.44	16.34	17.82
JDI Promotions	Hourly	15.86	16.32	16.40
	Interval	16.89	14.21	17.00

Note: Ns for all scales: UP, hourly = 21; EQ, hourly = 58; OP, hourly = 25;
UP, interval = 25; EQ, interval = 48; OP, interval = 18. The larger
the number, the greater the dissatisfaction.

Contrasts, p values, and η^2 s

for Satisfaction Data, Day 1, Experimentally-induced Inequity

Scale	Contrast	In Predicted		
		Direction	p value	η^2
MSQ total satisfaction	UP (both) vs EQ (both)	yes	<.001	>.25
	EQ (both) vs OP (both)	yes	<.08	<.20
JDI Work	UP (H-I) vs EQ (H-I)	no	<.04	<.20
	UP (I-H) vs EQ (I-H)	yes	<.04	<.20
	EQ (both) vs OP (both)	yes	>.30	<.20
JDI Supervision	UP (H-I) vs EQ (H-I)	no	>.30	<.20
	UP (I-H) vs EQ (I-H)	yes	>.18	<.20
	EQ (H-I) vs OP (H-I)	no	>.20	<.20
	EQ (I-H) vs OP (I-H)	yes	>.20	<.20
JDI People	UP (both) vs EQ (both)	yes	<.07	<.20
	EQ (H-I) vs OP (H-I)	no	>.20	<.20
	EQ (I-H) vs OP (I-H)	yes	>.30	<.20
JDI Promotions	UP (H-I) vs EQ (H-I)	no	>.45	<.20
	UP (I-H) vs EQ (I-H)	yes	<.005	>.20
	EQ (H-I) vs OP (H-I)	no	>.45	<.20
	EQ (I-H) vs OP (I-H)	yes	<.006	>.20

Results relevant to these hypotheses with the naturally-occurring inequity groups are presented in Tables 16, 17, and 18. The naturally underpaid groups show lower overall satisfaction on the MSQ (Table 16) than do the naturally equitably paid groups. As Table 18 indicates, this contrast is highly significant ($p < .0005$, $\eta^2 > .40$). Most of this difference is attributable to the H-I underpaid group. The two naturally overpaid groups must be considered separately since they are in opposite directions relative to their respective control groups (the Equity Condition by Pay System interaction is significant at $p < .04$). Contrasts of these two groups with their respective naturally equitably paid counterparts (Table 18) fail to demonstrate significant differences in either case, both p values are greater than .25; both η^2 s are less than .20.

Tables 16 and 17 also show the means and ANOVA tables for the p values, and η^2 s associated with the three effects. The patterns of means generally support the hypotheses. The patterns are exactly as predicted for the I-H groups, but in three out of the eight comparisons, the H-I groups' means do not follow the predicted pattern. The underpayment hypothesis received the greater support. All of these differences are not statistically significant, however. Table 18 summarizes the p values and η^2 s for the various differences.

Summary of Results Relevant to Satisfaction Hypotheses

1. Underpayment inequity generally resulted in greater dissatisfaction with pay than equitable pay conditions. The MSQ item dealing with pay showed the predicted effect in both experimentally- and naturally-induced inequity conditions. Naturally-occurring underpayment also resulted in greater dissatisfaction with pay ($p .10$) on the JDI pay scale, but there was no difference for experimentally-induced underpayment.
2. The satisfaction with pay of the overpaid groups did not differ from the equitably paid S s.
3. Underpaid S s generally exhibited more overall dissatisfaction than did equitably paid S s. These differences were most consistent in the naturally-induced underpayment groups.
4. Overpaid S s also displayed more overall job dissatisfaction than equitably paid S s. The effects are quite consistent for experimentally- and naturally-induced overpayment on the I-H pay system. The group on the H-I system most consistently supported the hypothesis for naturally-induced overpayment. The hypothesis was not generally supported by the H-I group when under experimentally-induced inequity.

TABLE 16
Mean Satisfaction, Day 4,
Naturally-occurring Inequity

Scale	Pay System	Equity Condition		
		UP	EQ	OP
MSQ total satisfaction	Hourly	40.28	40.47	44.60
	Interval	33.22	40.10	36.23
JDI Work	Hourly	30.50	28.29	30.33
	Interval	32.40	29.53	26.00
JDI Supervision	Hourly	17.58	16.43	19.67
	Interval	26.12	16.84	21.00
JDI People	Hourly	16.58	12.33	12.35
	Interval	13.76	11.00	19.50
JDI Promotions	Hourly	16.67	15.76	16.33
	Interval	16.08	16.68	13.50

Note: Ns for MSQ: UP, interval = 26; EQ, interval = 19; OP, interval = 2; UP, hourly = 10; EQ, hourly = 23; OP, hourly = 3. Ns for all JDI scales were 25, 19, 2, 12, 21, and 3, respectively. For the JDI, the larger the number, the greater the dissatisfaction.

TABLE 17

Analysis of Variance on Overall Satisfaction,
Day 4, Naturally-occurring Inequity

Dependent Variable	ANOVA Table				
	Source	df	MS	F	eta
MSQ total satisfaction	Equity Condition (A)	2	300.78	8.21**	>.40
	Pay System (B)	1	216.28	5.90*	>.25
	A x B	2	126.89	3.46*	>.27
	Error	77	36.64		
JDI Work	A	2	87.88	2.10	<.20
	B	1	26.44	.63	<.20
	A x B	2	20.36	.49	<.20
	Error	76	41.80		
JDI Supervision	A	2	435.09	10.26**	>.30
	B	1	291.25	6.87*	>.25
	A x B	2	151.73	3.58*	>.20
	Error	76	42.42		
JDI People	A	2	95.16	3.05	<.20
	B	1	39.48	1.27	<.20
	A x B	2	52.26	1.67	<.20
	Error	76	31.20		
JDI Promotions	A	2	2.56	.19	<.20
	B	1	.06	.004	<.20
	A x B	2	10.43	.76	<.20
	Error	76	13.68		

* p < .04 ; ** p < .0006

TABLE 18

**Contrasts, p values, and Etas
for Satisfaction Data, Day 4, Naturally-induced Inequity**

Scale	Contrast	In Predicted Direction	p value	eta
MSQ total satisfaction	UP (both) vs EQ (both)	yes	<.0005	>.40
	EQ (H-I) vs OP (H-I)	yes	>.25	<.20
	EQ (I-H) vs OP (I-II)	no	>.25	<.20
JDI Work	UP (both) vs EQ (both)	yes	<.05	>.20
	EQ (H-I) vs OP (H-I)	no	>.40	<.20
	EQ (I-H) vs OP (I-H)	yes	>.60	<.20
JDI Supervision	UP (both) vs EQ (both)	yes	<.0005	>.45
	EQ (both) vs OP (both)	yes	>.25	<.20
JDI People	UP (both) vs EQ (both)	yes	<.025	>.25
	EQ (both) vs OP (both)	yes	>.20	<.20
JDI Promotions	UP (H-I) vs EQ (H-I)	no	>.60	<.20
	UP (I-H) vs EQ (I-H)	yes	>.25	<.20
	EQ (H-I) vs OP (H-I)	no	>.50	<.20
	EQ (I-H) vs OP (I-H)	yes	>.80	<.20

Discussion

Equity conditions seem to interact with type of pay system in producing effects on job performance. Equity predictions were borne out better under hourly payment (i.e., expectancy is low that increased effort will lead to more pay) than under the interval payment method (i.e., expectancy is high that increased effort will lead to more pay). Means for the first three days' performance (Figure 2) follow the pattern of equity predictions, although the two separate comparisons (EQ v. UP; OP v. EQ) are not statistically significant. Moreover, the same pattern occurred for each of the three days (Table 4).

Equity predictions are also supported by the naturally-occurring inequity manipulations under the hourly pay system (Figure 4). After going to the hourly system, the naturally underpaid group decreased their performance more than the naturally equitably paid group, who, in turn, dropped more than the naturally overpaid group.

However, for Ss on the interval (high expectancy) condition, performance predictions are not upheld. The mean number of units above the minimum of the interval for the first three days follow a pattern opposite that predicted (Figure 3). For the first day the means are strongly opposite the predictions. While the predicted pattern does occur on the second and third days (Table 6), the differences are negligible. The results for naturally-occurring inequity are not much better (Figure 5). The naturally over rewarded group does appear to be performing as predicted, but these results are weakened because of the small number of Ss in the Over reward condition and because their immediately preceding high performance during the hourly payment condition may have induced goal setting cognitions or something akin to high level of aspiration.

As mentioned early in this paper, we were pessimistic about the likelihood of confirming equity predictions for the Over reward condition. Andrews (1967) and Moore (1969) both failed to find Over reward effects when Ss were made to feel overpaid because of "unexpected additional funds being available". It is of great interest, therefore, that equity theory predictions for Over reward were supported in our experiment for the low expectancy (hourly) payment method. While not reaching the usual standards of statistical significance, the pattern of results is in the expected direction for each of the three days. The strongest evidence of Over reward effects comes from the naturally induced hourly overpayment. After changing to the low expectancy payment method, the Over rewarded Ss decreased their performance by an average of less than one unit per hour; the equitably paid Ss dropped about three units per hour; and the Under rewarded Ss decreased by an average of six units per hour.

It is interesting that the naturally-induced hourly Over reward effects are so marked. The magnitude of the effect may be due to the very unambiguous nature of the comparison person. In experimentally induced Over reward, Other is indeed rather ambiguous and free to vary from subject to subject. There, Ss were implicitly asked to compare themselves merely with "other college students we have hired". In contrast, in the naturally induced condition, each subject is using his own immediate experience as the comparison base, and it should be very clear to him that similar Inputs to the job are suddenly yielding very different Outcomes from the job. This line of reasoning leads to a rather interesting hypothesis. Namely, equity theory predictions should be moderated according to the ambiguity-nonambiguity of the comparison object(s) used by employees (subjects) as they consider their own Outcome/Input ratios in their own specific job situations. This hypothesis bears importantly on methodology to be utilized in future studies bearing on equity formulations.

Performance data gathered hourly throughout our experiment fail to support temporal predictions from equity theory. Presumably, Over rewarded Ss should have decreased their performance more over time than equitably paid Ss. The pattern of findings shows very clearly that this did not occur. The theory has difficulty handling this finding because it appears that Over reward feelings were not dissipated cognitively to any great degree; instead, a more "costly" mode of inequity reduction (namely, sustained high effort) was utilized. Possibly, Over reward performance effects are more permanent than has previously been suggested (Lawler, 1968). However, this conclusion must be accepted cautiously, if at all. In the one condition where we are most confident that overpayment effects were occurring, naturally-occurring hourly overpayment, the mean performance did drop approximately three units more than for the naturally equitably paid group. This difference was not statistically significant ($p < .40$) but the sample size for this overpaid group was only five.

The predictions for underpayment over time were also not supported. The prediction was that their performance should remain the same over time relative to the equitably paid groups. In three out of four comparisons, the un-er-paid groups actually decreased more than the equitably paid Ss (Tables 4, 5, and 6). In the fourth, there was a decrease from Day 4 to Day 5 (Table 7). While not all of these differences are statistically significant, the pattern is highly consistent and the differences are large.

Equity theory offers no ready explanation for these results. Low performance may reduce feelings of underpayment inequity, and Ss who feel their low performance is justified may indeed continue to perform at low levels. While Ss could achieve equity by cognitively distorting

their Inputs and/or Outcomes, this would be more effortful since it would require an increase in performance. One would thus expect that performance would remain low. But if performance drops, as it did here, the theory must assume that feelings of underpayment inequity increased with time. It was actually easier to turn in reasonably high amounts of work as the Ss learned the job the first three days, so it is doubtful that increased Inputs in the form of effort were required. While Outcomes may have decreased, (e.g., the task becoming less interesting), there is no reason to expect that it became more uninteresting for the underpaid Ss than for anyone else. The theory would have to posit that either underpaid Ss were cognitively distorting their Inputs and Outcomes so that more inequity was generated, thus inducing them to decrease their performance, or that somehow the inequity effects for underpayment did not manifest themselves until later in the work period.

Some rather provocative findings occurred in exploring the relationship between equity and satisfaction. The theory predicts, as does common sense, that underpaid Ss should be less satisfied with their pay than equitably paid Ss. This is indeed what occurred (Tables 8, 10, 11, and 12). However, predicting lower overall job satisfaction goes beyond the original postulates of the theory since it requires the assumption that the inequity generated generalizes to the whole job situation. This prediction was supported. Total satisfaction on the MSQ showed large and significant effects for both experimentally-induced (Figure 6) and naturally-induced (Table 16) underpayment. The JDI scales also consistently supported the prediction for the I-H groups in both types of underpayment inequity (Tables 14, 15, 16, and 18). The predictions were not consistently supported for the H-I groups, especially for experimentally-induced underpayment. All in all, the overall satisfaction hypotheses were supported by the pattern of means in 16 out of 20 possible comparisons.

The overpayment predictions made by the theory present an even more difficult hurdle. Inequity, be it underpayment or overpayment, is postulated to induce an aversive state, thereby leading to lessened overall job satisfaction. In 15 out of the 20 possible comparisons, the mean satisfaction of the overpaid Ss was indeed less than that of the equitably paid groups. Expectancy theories are hard pressed to explain these results.

There is one finding that is rather confusing. Both the under- and overpayment hypotheses for satisfaction were more strongly supported by the groups under the I-H pay system. The pattern of means for the I-H groups supported the underpayment predictions in 10 out of 10 comparisons; overpayment predictions were supported in 9 out of 10. For the groups under the H-I pay system, the figures are only 6 out of 10 for both under- and overpayment.

While these results offer no immediate explanation, regrouping the findings by high and low expectancy offers some interesting possibilities. When Ss were under high expectancy, interval pay, the hypotheses were supported in 17 out of the 20 comparisons, under low expectancy, 14 out of 20.

These findings could be interpreted to mean that the higher the expectancy, the better the equity predictions are supported. Or, put another way, the higher the expectancy, the stronger aversive state generated by a given amount of inequity. Note that we do not say that the higher the expectancy the greater the inequity. If this were true, the I-H groups should show larger performance effects than the H-I groups, and this did not occur. These results seem to imply that in terms of satisfaction it is more important that workers under a high expectancy pay system perceive themselves to be equitably paid than it is for workers under a low expectancy pay system.

One of the goals of this research was to explore areas of equity theory that might be fruitfully included in a broader model of employee motivation. The necessity of this combination has been shown throughout this research. The graphs and ANOVA tables show large and significant differences due to the two levels of expectancy. However, expectancy theories do not give the whole story. They cannot easily explain many of the findings predicted by equity theory. Performance differences due to inequity are not easily handled by expectancy formulations.

Our findings on job satisfaction offer evidence that equity concepts are necessary in motivation theory. For example, Porter and Lawler (1968) suggest that job satisfaction is related to "the extent to which the rewards actually received meet or exceed the perceived equitable level of rewards (p. 30)". While the results of this research support their model for the case where actual rewards are less than equitable rewards (underpayment), the findings indicate that satisfaction is not linearly related to equitable rewards as Porter and Lawler imply. Rather, satisfaction apparently is lower in situations of Over reward. Moreover, this non-linear effect seems more marked under high than under low expectancy payment conditions.

If these results are supported by future research, and can be integrated into a broader model of employee motivation, equity theory will have made a substantial contribution.

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<p>Research reported here was aimed at testing and clarifying several aspects of Equity theory. An experiment was conducted wherein 253 male college students were hired and worked for seven consecutive half-days. For them, the job was a real job, and they were not aware that their performance and job satisfaction was being studied systematically in relation to different methods of wage payment and different conditions of equity and inequity.</p> <p>The experimental design allowed tests of Equity theory deductions under conditions of both experimentally induced and naturally induced feelings of inequity. The naturally-occurring induction was produced by changing the pay system half way through the week's work. As a result of the change in pay system, some of the employees, with no change in effort, experienced either more or less net pay--thereby generating "natural" feelings of Over and Under reward.</p> <p>Results in general are supportive of Equity theory deductions. Over reward effects on performance did occur and were especially strong for the naturally-occurring condition. Under reward</p>			

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<p>(cont.)</p> <p>on performance also were marked. Effects on overall job satisfaction showed that employees, under both Over reward and Under reward conditions were less satisfied than employees made to feel equitably paid. Effects on job satisfaction were particularly strong under high incentive (modified piece rate payment) as opposed to low incentive (flat hourly pay) conditions.</p>			

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