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Evaluation of a Computer Simulation to Assess Subject Preference for Different Types of Incentive Pay: Part Two

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EVALUATION OF A COMPUTER SIMULATION TO ASSESS SUBJECT PREFERENCE FOR DIFFERENT TYPES OF INCENTIVE PAY: PART TWO

by

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EVALUATION OF A COMPUTER SIMULATION TO ASSESS SUBJECT PREFERENCE FOR DIFFERENT TYPES OF INCENTIVE PAY: PART TWO

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This study further investigated the use of a computer simulation to assess subject preference for different types of pay systems. Subjects were eight undergraduates recruited from psychology classes at Western Michigan University. The dependent variable was the subjects' choice of pay system, either simulated hourly pay or base pay plus incentive. Simulated work performance was determined by the computer with 0.50 probability of low or high performance. For Experiment 1, the independent variable was the maximum amount of simulated pay that subjects could earn under each pay type. For Experiments 2 and 3, the independent variable was the percentage of simulated expenses relative to total expected simulated pay. The simulated expense conditions were 85% and 95% of total pay for Experiment 2 and 50% and 100% of total pay for Experiment 3. Every four simulated weeks, subjects paid simulated expenses. There were four phases for each session. The adequacy of the simulation was assessed by examining the stability of subjects' choices. The manipulation of simulated pay amounts controlled subjects' responding in Experiment 1, with all subjects selecting the pay type with the greater payoff. The simulated expense conditions

in Experiments 2 and 3 did not control subjects' responses. These data suggest that overall, subjects did not prefer one pay type over the other.

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Stephen Mark Sundby

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CHAPTER I

INTRODUCTION

Pay-for-Performance Systems

Monetary incentive or pay-for-performance systems are those in which a worker's compensation is in some way determined by his/her productivity. The concept of pay-for-performance is not new. Although monetary incentives have probably been used for millennia, Frederick Taylor and his "scientific management" popularized pay-for-performance systems in the 1900s (Locke, 1982). Taylor, after observing a steel worker with excess energy after work, wondered if there was a way to increase the productivity of all workers. He reasoned that workers would put forth a greater effort on the job if their compensation was based on their productivity and in the 1920s convinced several employers to try monetary incentive plans. Studies in laboratory and actual work settings (reviewed by, Farr, 1976; Gaetani, Hoxeng, & Austin, 1985; Locke, 1982; Orpen, 1982; Terborg & Miller, 1978; Weinstein & Holzbach, 1973) have repeatedly confirmed that performance can be substantially increased with the use of monetary incentives.

The use of pay-for-performance systems became common early in this century, but its popularity eventually declined (Locke, 1982). The decline in

popularity of pay-for-performance systems has been attributed to the onset of the human relations movement. The human relations movement was brought about principally by a group of studies conducted from 1927 through 1932 at the Hawthorne plant of the Western Electric company located in Cicero, Illinois (Landy, 1989). Elton Mayo, a major figure in these studies, was an ardent opponent of scientific management and introduced the concept of human relations as a substitute for Taylor's scientific management (Landy, 1989). This movement, still popular today, looks to such areas as interpersonal communication, work motivation, and social environment for answers to productivity problems (Landy, 1989). Interestingly, in a recent analysis of the Hawthorne Studies, Parsons (1992), contends that the development of objective measures and contingent pay could account for the increase in productivity observed in those studies.

In recent years, the use of pay-for-performance systems in organizations has regained some popularity (McAdams & Hawk, 1992; O'Dell, 1986). Some experts believe this is due to a worsening world economy (Blinder, 1990; Lawler, 1990). Many organizations, concerned with an increasingly competitive marketplace, have turned to pay-for-performance systems as a means of increasing worker productivity. Research interest in such programs has emphasized not only productivity, but job satisfaction as well. Interest in job satisfaction is predicted on the assumption that satisfaction affects, or at least covaries with behaviors associated with productivity or profitability such as absenteeism, and turnover (Cotton & Tuttle, 1986; Weiner, 1980), prounion voting behavior (Heneman &

Sandver, 1983), and extra-role behaviors (Scholl, Cooper, & McKenna, 1987). Some authors have argued that we have a moral obligation to investigate issues of equity in compensation (e. g., Mawhinney, 1984) and pay continues to be an important issue with employees (Heneman, 1985; Lawler, 1971). The importance of pay systems to employees may, in part, explain the increased interest in determining the factors associated with pay satisfaction or "preference" (e.g., Heneman, 1985; Lawler 1981).

Traditional Pay Satisfaction Research

Much of the research associated with pay satisfaction has been concerned with understanding the types of comparisons people make when evaluating alternative pay systems. One popular theory used to guide research investigating job satisfaction is discrepancy theory (Locke, 1969). According to Locke (1969, p. 316), "Job satisfaction and dissatisfaction are a function of the perceived relationship between what one wants from one's job and what one perceives it as offering or entailing." Locke (1969) contends that three elements influence satisfaction: (1) the perception of some aspect of the job, (2) an implicit or explicit value standard, and (3) a conscious or subconscious judgment of the relationship between one's perception(s) and one(s) value(s). An important distinction Locke (1969) makes is between the concept of what one "values" and what one "needs." "A value is that which a man *actually* seeks to gain and/or considers beneficial" (Locke, 1969, p. 320). Values are objects or events that a person desires, wants,

or seeks to obtain. In contrast, "needs" are those things that organisms biologically must have to maintain their physical health and survival, such as food and water. The distinction is an important one to Locke (1969), because what one "values" may or may not meet the "needs" of an organism, yet it is what one "values" that governs "emotional responding." For example, when applied to satisfaction with compensation or pay, individuals would (a) have some perception of the amount of their compensation, (b) some perception of the amount they should be earning, and (c) a judgement of the relationship (discrepancy) between their compensation and the amount they perceive they should be earning.

Berger, Olson, and Boudreau (1983) tested Locke's (1969, 1976) discrepancy model by investigating the effects of unions on several facets of job satisfaction, among them pay satisfaction. They used multiple regression and logit analyses to analyze data from a national sample of 1455 adults who were working at least 20 hours a week. Berger and colleagues (1983) concluded that unions do not have a direct effect on pay satisfaction. However, they (Berger et al., 1983) concluded that unions had an indirect effect on pay satisfaction and "on average, union members are more satisfied with their pay because they place greater value on pay outcomes, and because they receive more pay outcomes in the form of both direct pay and fringe benefits" (Berger et al., 1983, p. 304). In other words, the high "value" placed on compensation held by union members may be the primary variable associated with their pay satisfaction. They select union jobs due to the

higher pay (Lewis, 1984), and then receive greater compensation and thus are more satisfied with their pay.

In a replication of the Berger el al. (1983) study, Evans and Ondrack (1990), also concluded that there is a relationship between unionization and satisfaction with pay. They surveyed 1193 fully employed, male, blue-collar workers about their satisfaction with the job itself and with pay. As in the Berger et al., (1983) study, they found no relationship between union status and the actual work performed. However, even after controlling for such variables as hours worked and demographics, they (Evans & Ondrack, 1990) found union status was associated with pay satisfaction.

Rice, Phillips, and McFarlin (1990) tested the multiple discrepancies hypothesis, an extension of Locke's discrepancy model, as it relates to pay satisfaction. In their words, "This hypothesis proposes that pay satisfaction is determined by an appraisal process in which actual salary is compared simultaneously with several standards of comparison" (Rice et al., 1990, p. 386). They measured (a) pay satisfaction, (b) current salary, (c) four personnel standards of comparison, and (d) demographics in a mail survey of 169 mental health professionals. They found that the correlation between the combined discrepancy-related variables and the four standard measures of comparison was significantly greater than the correlation between the discrepancy-related variables and any single comparison. Rice et al. (1990) concluded from their results that individuals

use multiple comparisons in determining their subjective satisfaction with pay as opposed to a single comparison.

"Equity Theory (Adams, 1963, 1965) adds the dimension of justice within a social comparison framework in relation to referent others" to discrepancy theory (Huber, Seybolt, & Venemon, 1992, p 1357). In Adam's Equity Theory (1963, 1965) pay satisfaction is proposed to be determined by individuals comparing their amount of compensation with that of their peers. For example, if a person compared his/her compensation with that of peers doing the same or similar work and determined that he/she were the lowest paid worker, this may be perceived by the worker as not being "equitable," resulting in lower satisfaction or dissatisfaction with the pay system. Systems in which compensation is fairly "balanced" across workers would be perceived as more satisfactory or "equitable."

Lawler (1971) believed that discrepancy theory and equity theory did not completely explain how individuals determine satisfaction with pay. Lawler (1971) proposed a revised discrepancy model that addresses the issue of pay satisfaction by combining traditional discrepancy theory and equity theory. A key feature of Lawler's revised discrepancy model is that people not only compare their compensation with that of others, but also consider their inputs in association with their outputs when considering the equality of their compensation. For example, if a worker's perception was that they were performing at a higher level than fellow workers, yet receiving less compensation, they may be dissatisfied with their pay. However, if their perception is that they are receiving a comparable amount of

compensation as others, based on their relative inputs (performance), they may be satisfied with the system.

Using this model, Gomez-Mejia and Balkin (1984) assessed empirically the relationship between the presence or absence of a faculty union and the level of faculty pay satisfaction in a nonunion and a union university system. They used five items from the pay scale of the Minnesota Satisfaction Questionnaire along with four questions designed to measure (a) satisfaction with benefits, (b) future pay expectations, (c) cost of living adjustments, and (d) the way pay raises were given. Their results indicated that the presence of a faculty union is positively associated with pay satisfaction, after controlling for several correlates of pay satisfaction. Gomez-Mejia and Balkin (1984) determined that unions moderate the relationship between gender and pay satisfaction. While there was no difference in satisfaction between the sexes in a nonunion system, women were more satisfied with their pay than males in the union system. They speculated that the union environment tends to reduce gender differences in pay, making the system more equitable. Further, they found that untenured faculty members were more satisfied with their pay in both union and nonunion systems than tenured faculty. While they are unclear of the cause of this phenomenon, they speculated that it was the result of a "wage compression effect," in which the compensation of new untenured faculty rises faster than that of older, tenured members, who may be near the top of the pay scale. Further, they speculate that in many cases tenured

members are more "locked" into the system, with less professional mobility, which may reduce their job satisfaction.

Huber, Seybolt, and Venemon (1992) examined the relationship between individual inputs and perceptual variables on four facets of pay satisfaction. They examined (1) the effects of actual pay on pay satisfaction, (2) the effects of individual inputs on pay satisfaction, (3) the effects of perceptual variables on pay satisfaction, and (4) the moderating effects of pay level. Three hundred and one university faculty members were surveyed using the Pay Satisfaction Scale (Heneman & Schwab, 1979). Huber et al. (1992, p. 1368) reported that,

> consistent with the revised discrepancy model of pay satisfaction (Dyer & Theriault, 1976; Lawler, 1981), perceptual variables were strongly associated with pay level satisfaction (37.3%). Reinforcing earlier findings (Heneman et al., 1988), contingent pay was the most important determinant of pay level satisfaction.

They concluded, "from a practical perspective, the results of this study suggest that establishing a pay-for-performance compensation system may be the most effective way to promote pay satisfaction" (p. 1370).

A fundamental tenet of all discrepancy theories is that job satisfaction is influenced by a comparison of actual and referent characteristics of employment. Goodman (1974) theorized that people use multiple referents in determining their satisfaction with pay. He established three classes of referents: (1) other, (2) system, and (3) self. Individuals are using the first class of referent, "other," when they compare their pay with that of someone else. This may be someone holding the same position within specific boundaries, but is not limited to that comparison.

For example, workers may compare their compensation with that of someone working alongside of them, or they may make comparisons with "others" doing similar work in another department or organization. A "system" referent is used when the workers are comparing their pay with expectations resulting from being a member of the system. For example, if a company has always given a merit pay increase every year in conjunction with a cost of living adjustment, individuals come to expect that pay adjustment. However, if the company were to withhold the merit pay increase, then satisfaction with pay may change as a result of a system action. "Self" referents are those comparisons that are unique to the individual. For example, if workers were to compare their present job performance and compensation with a previously held level of job performance and compensation, and determined that they previously made more money for less output, they may not find their current pay as satisfying. Goodman (1974) further contents that within each of these classes there are different categories of referents, such as other-inside, when a person makes a comparison to someone inside certain boundaries, and other-outside, when referring to an individual from outside the boundaries. In testing these propositions, Goodman (1974) surveyed 217 managers from a single firm using a 3-hour interview, a questionnaire, and company records. In general, Goodman's (1974) results support the position that people use multiple referents in establishing pay satisfaction. This finding is consistent with the subsequent conclusions of Rice et al. (1990).

Summers and DeNisi (1990), reexamined five of Goodman's (1974) six hypotheses. Using different measures and a different sample, they supported Goodman's (1974) findings that (a) other, system, and self classes of referents are significantly associated with pay satisfaction; (b) perceived balances between ones input/output with others exhibit stronger associations with pay than objective measures such as pay level; and (c) as people move up the professional ladder they are more likely to select referents outside the focal organization. These findings tend to support equity theory as proposed by Adams (1965).

Lee and Martin (1991) looked at internal and external referents as predictors of pay satisfaction among employees in a two-tier wage setting. A two-tier wage setting is one in which employees are hired at a lower pay than previously hired employees. Lee and Martin (1991) hypothesized that equity theory, in which workers compare their inputs and outcomes against others' inputs and outcomes in determining pay satisfaction, and relative deprivation theory, in which a state of deprivation resulting from these comparisons between the outcomes they receive and those of another group, help explain pay satisfaction. Lee and Martin (1991) used a five-point Likert-type response scale to investigate 868 retail food chain workers' satisfaction with pay relative to four internal referents: (1) high-tier employers, (2) low-tier employers, (3) full-time workers, and (4) part-time workers. Four external referents were also examined: (1) those working in heavy industry, (2) those in fast food industry, (3) those at other places where the respondent might obtain work, and (4) those working for competitors.

Statistical analyses were performed using MANOVA. Results suggest that employees make comparisons with similar status referents to help determine the amount of equity and to higher status referents to determine the amount of deprivation.

Taylor and Vest (1992) investigated the extent to which public sector employees make particular pay comparisons and the impact of (a) external, (b) personal, (c) economic, and (d) ego referents on pay satisfaction. Two hundred and twenty-four blue-collar and white-collar municipal employees from a variety of departments were surveyed. Taylor and Vest (1992) concluded that comparisons made to external referents tend to reduce pay satisfaction, while personal comparisons tend to increase pay satisfaction.

Blau (1994) tested whether level and importance of a pay referent interact to affect pay level satisfaction. "Level" refers to a respondents' comparison of pay, to referents on some quantitative scale, such as a Likert. "Importance" deals with the subjects' perceived importance of the referent. Blau (1994) tested the hypotheses that (a) there will be a significant positive relationship between level of each pay referent and employee pay satisfaction, (b) there will be a significant negative relationship between importance of each pay referent and employee pay satisfaction, and (c) there will be a significant interaction in level and importance of a pay referent in determining pay satisfaction. The pay referents used were (a) financial, (b) historical, (c) organizational, (d) market, and (e) social. The Job Descriptive Index (Smith, Kendall, & Hulin, 1969), Minnesota Satisfaction

Questionnaire (Weiss, Dawis, England, & Lofquist, 1967), and the Pay Satisfaction Questionnaire (Heneman & Schwab, 1985) were used to analyze the pay satisfaction of 162 pharmaceutical managers. Blau (1994) found that level and importance of pay referents interact to affect pay level satisfaction. In other words, the managers' reported pay level relative to others and the importance given to the referent (other) interacted to establish the manager's perceived pay satisfaction. This finding is consistent with other research suggesting that level and importance of pay referents interact to affect satisfaction (Rice, Gentile, & McFarlin, 1991; Summers & Hendrix, 1991).

While several theory-driven researchers have examined the role of referents in determining job satisfaction, others have investigated the role of specific organizational policies and procedures. For example, providing (or failing to provide) information about company-wide pay scales may affect satisfaction. In a survey evaluating the referents used by managers to determine job satisfaction, Blau (1994) found that:

> [m]anagers who perceived that the market and organization referents were important and they had a lower level than these referents were dissatisfied. Conversations with pharmaceutical Human Resource personnel indicated that the organization's pay policies were not "open" to employees. In a "secret" pay policy, individuals estimate comparison others' pay. Research (Lawler, 1971) has found that in a secret pay system managers tend to overestimate other managers' pay relative to their own. Managers believing that work comparison others within and outside the organization make more than they do will have less organization (fairness) pay satisfaction (p. 1265).

The importance of organizational policies and procedures is clearly evident in procedural justice studies, an area of research that may be relevant to pay satisfaction (Greenberg, 1987). Although distributive justice has traditionally been the main focus of organizational researchers, procedural justice has grow as an area of research in recent years (Greenberg, 1987). Procedural justice refers to the perceived fairness of the system used to determine compensation, whereas distributive justice refers to the perceived fairness of the amount of pay received (Folger & Konovsky, 1989). In general, studies (e. g., Lind & Tyler, 1988; McFarlin & Sweeny, 1992; Sweeney, Mcfarlin, 1993; Tyler & Caine, 1981) that have examined the effects of procedural and distributive justice have found that procedural justice is a better predictor of organizational-level attitudes and distributive justice is a better predictor of personal-level attitudes. Procedural justice would appear to be associated with Goodman's (1974) concept of a system referent. In a recent study of procedural justice, Folger and Konovsky contend that "research in legal and political contexts has suggested that procedural justice is more closely related to the *evaluation* of systems or institutional characteristics, whereas distributive justice is more highly related to the *evaluation* of specific outcomes" (1989, p. 115, italics added). For example, in a study dealing with reactions to pay raises, Folger and Konovsky (1989) surveyed 217 employees of a privately owned manufacturing plant to determine the effect of distributive and procedural justice on their reactions to decisions about pay raises. They concluded that distributive justice accounted for more of the variation in satisfaction with pay

than procedural justice. However, Folger and Konovsky also note that "procedural justice also makes a significant contribution to pay satisfaction" (1989, p. 125). The results from procedural justice research suggest that when individuals perceive the system as fair, they are more likely to be satisfied with their compensation, and when the system is unfair, they are dissatisfied with their compensation.

In summary, the traditional survey literature suggests that people are concerned with the perceived fairness of the payment system. Further, they make multiple comparisons with others as to the perceived fairness and balance of the distribution of compensation, considering both inputs and outcomes. These studies suggest that an equitable compensation system results in employee satisfaction with pay. As suggested by Huber et al. (1992), pay-for-performance systems when properly designed and implemented may be the most equitable system for insuring satisfaction with pay.

Pay-for-Performance Satisfaction Research

Few studies have examined worker satisfaction with pay-for-performance systems. Miceli, Jung, Near, and Greenberger (1991) attempted to identify features of pay-for-performance systems that may be associated with pay satisfaction. They analyzed archival data from 22 public sector organizations. In general, Miceli et al. (1991) found that (a) receipt of performance-based rewards are positively associated with pay-system reactions, (b) endorsement of the merit pay concept and perceptions of effort-reward consonance are significantly associated with reactions

to the pay system, (c) external comparisons are more closely related to reactions about salary than pay systems, and (d) variables reflecting procedural justice in the administration of pay are positively associated with pay system reactions. Interestingly, Miceli et al. (1991) reported that satisfaction with a *pay system* and satisfaction with *perceived pay* earned under that system did not always covary highly. The implication is that the predictors of pay satisfaction and pay-system satisfaction are not the same.

Results consistent with the notion that reaction to pay systems and perceived pay under a given system may differ were reported by Brown and Huber (1992). They investigated the effects of a pay-for-performance system on pay satisfaction by assessing employee responses when a traditional variable pay plan was replaced by an earnings-at-risk plan. An important aspect of this study was the differentiation of pay outcome satisfaction and pay process satisfaction. One hundred one employees of a large publicly held bank were surveyed before and after the implementation of an earnings-at-risk (EAR) incentive pay plan. Brown and Huber (1992) concluded that negative reactions to pay outcomes were stronger than negative reactions to general pay processes. This would suggest that the actual amount of pay received was more salient than the process involved in determining pay. However, in an important postscript, the authors noted:

> [B]ased on the levels of employee dissatisfaction resulting from the EAR pay plan, the bank returned to the variable pay system that had been in place at the time of the first survey. Base pay was raised to match the market and variable pay was administered in the form of bonuses (Brown & Huber, 1992, p. 308).

This quote highlights the need for employers to make sure that employees thoroughly understand, and are satisfied with, any compensation system that is implemented.

Pritchard and his colleagues (Pritchard, Hollenback, & DeLeo, 1980; Pritchard, Leonard, Von Bergen, & Kirk, 1976) have discovered that exposure to alternative pay systems can influence employee preferences. In one study (Pritchard et al., 1976), subjects were exposed to hourly pay and three different incentive pay arrangements. When asked to rate their satisfaction with the pay systems on an attitudinal questionnaire, they rated the three incentive pay arrangements as equally attractive and the hourly pay as least attractive. However, in a second study (Pritchard et al., 1980) in which subjects were exposed to only one of the pay arrangements, there were no differences in satisfaction across the pay arrangements. Further, satisfaction ratings altered with exposure; that is, daily satisfaction ratings were significantly different on the first versus the fifth day of exposure to the pay arrangements, leading the researchers to conclude that evaluations of such pay arrangements must only occur after subjects have experience working under them. Therefore, in order to determine subject preference for various payment systems, subjects should be exposed to all the relevant payment systems. Further, they should be asked to choose their preferred system, and then be exposed to that system.

Two factors that have been shown to affect workers' satisfaction with pay-for-performance systems are the degree to which pay is contingent upon

performance (Cherrington, Reitz, & Scott, 1971; Greene, 1973; Gupta, 1980; Heneman, Greenberger & Strasser, 1988; Miceli, Jung, Near, & Greenberger, 1991) and the accuracy of the performance measurements used to determine pay (Dyer & Theriault, 1976; Miceli et al., 1991).

In general, studies that have examined the relationship between compensation systems and pay satisfaction have obtain conflicting results (e.g., Dickinson & Gillette, 1993; Heneman & Schwab, 1979; Latham & Huber, 1992; Opsahl & Dunnette, 1966; Thierry, 1984, 1987). This may, in part, result from the use of self-report measures in determining satisfaction with pay. Social (e.g., Ajzen & Fishbein, 1977) and behavioral psychologists (e.g., Lockhart, 1979) have found that self-report measures of attitude are inconsistent in their ability to predict actual behavior. Further, as concluded by Miceli et al., (1991) the predictors of "worker satisfaction with pay" and "worker satisfaction with pay systems" are not the same. This would reduce the usefulness of the pay satisfaction research in determining the variables workers prefer in pay systems. As a result, little is known about the variables that affect preference for particular pay systems.

Simulation Research

The use of simulations may prove to be a feasible alternative for investigating the variables associated with employee/subject preference for certain pay systems. Since manipulating compensation systems in most organizations would be problematic (Hickson, 1963), a laboratory simulation would appear to be

a viable alternative for studying the variables associated with pay satisfaction or preference.

The use of a simulation that would allow for variables to be manipulated, with subjects selecting the pay type they would like to "work" under, was investigated by Oah (1989). Oah (1989) tested the possibility of using a board game in a laboratory setting to assess subjects' preference for pay systems. The percentage of monthly expenses relative to total expected earnings, either 85% or 95%, was the independent variable. Each simulated month subjects chose 0%, 25%, 50%, 75%, or 100% of their total pay to be provided in incentives. The choice of the percentage was the dependent variable. Oah (1989) contended that if the simulation was valid, subjects would select lower percentages of incentives in the 95% expense condition than in the 85% condition, because they would be less willing to put a large amount of their pay at risk in the former condition. That is, the higher the percentage of incentives subjects selected, the greater the risk that they would not have enough money to pay their expenses when those expenses constituted a high proportion of their total pay. Ten three-person groups were exposed to various sequences of the two expense conditions. Worker productivity was simulated by a roll of a die, which determined the amount of simulated weekly pay the subject would receive. A roll of 1 equalled poor performance; rolls of 2, 3, 4, or 5 equalled average performance; and a roll of 6 equalled excellent performance. Four rolls of the die, one roll for each simulated week, represented the subject's work performance for one simulated month. After one

month, subjects were given a list of simulated monthly expenses (85% or 95%) and paid their expenses. Once the bills were paid, subjects again selected which payment system they would work under for the following month.

Subjects received compensation for their participation. The subject in each group with the highest accumulated earnings received $5.00, the subject with the second highest total received $3.00, and the subject with the lowest number received nothing. The results revealed that the independent variable did, to some extent, control subject selection of the percentage of incentive pay to total pay (dependent variable). Overall, 18 of the 30 subjects demonstrated sensitivity to manipulations of the expense condition. Ten of these 18 subjects responded as expected by selecting lower percentages of incentive-based pay when their expenses were high. With respect to those subjects that responded inconsistently, Oah (1989) suggested that the competitive nature of the group environment created by the differential payment method may have influenced responding more than the expense condition. In an attempt to obtain higher simulated earnings than the other group members, subjects may have selected higher incentive percentages even though that also increased the risk of not having enough funds to cover their expenses, particularly in the 95% expense condition. Nonetheless, the results of this initial simulation were promising.

Sundby, Dickinson, and Michael (in press) used a computer simulation to extend Oah's (1989) introductory research. Aside from using a computer simulation, the Sundby et al. (in press) study differed from the Oah (1989) study in

3 fundamental ways. First, subject participation and compensation were on an individual level to control for the possibility that group interactions may affect responding. Second, there was an increased probability of excellent simulated performance if the subject selected incentive-based pay in more than one consecutive simulated pay period. Studies (e.g., Farr, 1976; Gaetani et al., 1985; Locke, 1982; Orpen, 1982; Terborg & Miller, 1978; Weinstein & Holzbach, 1973) have shown that performance usually increases under incentive-based pay systems as opposed to time-based pay systems; therefore, the simulation was modified to more closely resemble "real world situations." Third, upon selection of a pay system, subjects were exposed to that system for three consecutive simulated months, rather than one, in order to greater expose subjects to the expense condition under that pay system and to the consequences of that selection.

As in the Oah study (1989), it was expected that subjects would be more likely to select higher percentages of incentive-based pay when they were "working" under the 85% expense condition in comparison to the 95% expense condition. Although Oah (1989) reported that "the majority of subjects displayed sensitivity to the expense manipulations and eighteen of thirty subjects responded consistently to systematic manipulations of the expense conditions," (p.42), the Sundby et al. (in press) study did not control responding to this extent. Only three subjects demonstrated any control by selecting higher incentive pay percentages under the 85% expense condition and lower incentive pay percentages under the 95% expense condition. However, initial selections (during the first phase)

suggested that the simulated expense percentage did somewhat control the selection of pay type. This suggests that with refinement, a simulation like that used by Sundby et al. (in press) may be a viable way to investigate the variables that affect preference or satisfaction with a pay system.

The purpose of the present study was to continue investigating the use of a computer simulation to assess subject preference for different types of pay systems. This study considered several variables that may explain the less than compelling results from previous studies. First, this study used a dichotomous dependent variable for all the experiments, with stable responding used to determine phase changes. There were two pay types; hourly pay and base pay plus incentive. It was thought that by narrowing the choices, a stable, systematic pattern of responding would develop. Second, since we were interested in determining what subjects prefer about pay systems rather than controlling their behavior with monetary incentives, subjects were not compensated based on any performance criteria. Comments made by subjects during debriefing in the Sundby et al. (in press) study, suggest that the monetary contingencies placed on the performance of subjects in the simulations may have resulted in random selection of pay types in an attempt to maximize compensation for participation in the simulation. Since we were primarily concerned with preference, rather than the established effects of monetary incentives, subjects were compensated for completion of the study. Therefore, their selections were not based on trying to achieve the maximum amount of simulated savings. Third, there was a 0.5 probability of either high or

low productivity being selected. This was done to simplify this aspect of the simulation. Fourth, one experiment of the study was made very simple to determine if the usual simulation was too complex for subjects. Based on subject responses during debriefing (Sundby et al., in press), it appeared that subjects did not fully understand the variables or interaction of variables associated with the simulation, even though their self-report data suggested that they understood the simulation. In order to investigate the possibility that subjects did not fully understand the variables in the simulation, the expense condition was held constant at 95% across all phases, while the maximum amount of simulated pay that could be earned under each pay type, either hourly or base pay plus incentive was manipulated. It was assumed that stable responding would be obtained under these conditions.

CHAPTER II

METHOD

Subjects

Subjects were eight volunteers (3 males, 5 females), ranging in age from 19 to 25, recruited from undergraduate psychology classes at Western Michigan University. Subjects were required to pass a seven-question selection quiz (Appendix A) on basic percentages and finances to participate. The quiz determined if potential subjects understood the basic percentages and finances necessary to perform the simulation. The study received approval from Western Michigan University's Human Subject Institutional Review Board (Appendix B) before onset of the study. Informed consent was obtained in writing from subjects prior to their inclusion in the study. A copy of the informed consent form is in Appendix C. Subjects 1, 2, 3, and 4 received $10 for completing Experiment 1, while Subjects 5, 6, 7, and 8 received $30 for completing Experiments 2 and 3.

Setting

Sessions were conducted in a small room, approximately 2 meters by 2 meters, located in the Behavioral Pharmacology Laboratory, Department of Psychology, Western Michigan University.

Apparatus/Materials

The apparatus consisted of a Commodore Colt microcomputer (IBM compatible) running a program written by the author in GW-BASIC.

Experiment 1

Four subjects (1, 2, 3, 4) participated in this study.

Simulated Work Performance

Simulated work performance was determined by the selection of a number by the computer. Simulated work performance was categorized as low or high, corresponding with "real world" conditions in which workers either fail to meet criteria necessary to obtain incentives (low productivity) or meet criteria and receive incentives (high productivity). One number represented one week's simulated work performance. Four weeks constituted a month.

Low and high simulated work performance was represented by the numbers 1 and 2, respectively. The computer controlled the frequency that these numbers were selected, with a 0.50 probability of either number being chosen.

Dependent Variable

The subjects' choice of simulated pay type, either hourly or base pay plus incentive, was the dependent variable. At the beginning of the simulation and

every three simulated months thereafter, subjects chose whether they would receive hourly pay or base pay plus incentive. The computer automatically recorded the choice of the subject.

Independent Variable

The maximum amount of simulated pay, either $2000 or $4000, that a subject could earn under each pay type was the independent variable for Experiment 1. Table 1 displays the total amount of monthly pay that subjects could receive based on the simulated pay system selected and their simulated work performance. Total earnings equaled the total amount of money that subjects could earn per simulated month based on the pay system selected and their simulated work performance. The specific calculations used to arrive at the amounts in Table 1 are contained in Appendix D.

Simulated Expenses

Every four simulated weeks subjects were required to pay simulated expenses. At expense time, a screen would inform the subject that it was "Time to Pay Expenses" and deduct the appropriate amount from the subject's account and update the financial statement screen. If there was not enough money in the simulated savings account, then a loan was given at 20% interest. The loan was paid back from future earnings. Expenses were 95% (Table 2) of the total expected simulated earnings for Experiment 1.

Table 1

Simulated Weekly Pay for Experiment 1

Pay Condition 1 (High Base Pay Plus Incentive)				
Hourly Pay				
Performance	Base Pay	Incentive Pay	Weekly Pay	Hourly Rate
Low	$500	$0	$500	$12.50
High	$500	$0	$500	$12.50
Base Pay Plus Incentive				
Performance	Base Pay	Incentive Pay	Weekly Pay	Hourly Rate
Low	$900	$0	$900	$22.50
High	$900	$200	$1100	$27.50
Pay Condition 2 (High Hourly)				
Hourly Pay				
Performance	Base Pay	Incentive Pay	Weekly Pay	Hourly Rate
Low	$1000	$0	$1000	$25.00
High	$1000	$0	$1000	$25.00
Base Pay Plus Incentive				
Performance	Base Pay	Incentive Pay	Weekly Pay	Hourly Rate
Low	$450	$0	$450	$11.25
High	$550	$100	$550	$13.75

Simulation

The computer simulation program was loaded by the experimenter prior to the subject's arrival. When the simulation was loaded, an identification number used for data collection purposes, along with the beginning experimental condition was entered by the experimenter. Although the computer controlled all aspects of

Table 2

Total Amount of Monthly Expenses for Experiment 1

Pay Condition 1 (High Base Pay Plus Incentive)		
Pay Type	Total Pay	95% Expense Condition
Hourly Pay	$2000	$1900
Base Pay Plus Incentive	$4000	$3800
Pay Condition 2 (High Hourly Pay)		
Pay Type	Total Pay	95% Expense Condition
Hourly Pay	$4000	$3800
Base Pay Plus Incentive	$2000	$1900

the simulation, the experimenter was present during the entire session for subject questions.

The first few screens contained the instructions for the simulation. The subject could read the instruction file as many times as desired, by responding "y" to the computer prompt asking if he/she would like to see the information again. The instruction file is provided in Appendix E. Responding "n" to the prompt started the simulation.

The subject was presented with a short demonstration of the simulation at the start of the practice session. During this part of the simulation, the subject was required to press a key, prompted by messages on the screen, to continue through the simulation. Both pay types were presented during the demonstration to ensure that the subject was familiar with the program and the pay schedules prior to actual data collection.

After the demonstration, the computer displayed the condition in effect for the first phase as described in the "Independent Variable" section. The subject was required to answer a multiple choice question at the start of each phase to determine if the subject understood the current condition.

The subject was then prompted by the computer to select the pay type that he/she would have in effect for the first three simulated months. The subject could select either hourly pay or base pay plus incentive as described in the "Dependent Variable" section.

After pay type selection, the computer determined the simulated work performance by selecting a number that corresponded with low or high simulated work performance. The subject's simulated work productivity was manipulated as described in the "Simulated Work Performance" section.

Once the computer selected the simulated performance level for the subject, the appropriate amount of simulated pay was displayed on the financial statement screen (Appendix F). All income was placed in a savings account for later payment of expenses. At the end of each simulated month simulated expenses were paid as described in the simulated expenses section above.

The financial statement screen was displayed throughout the simulation and showed the number of the current simulated week, simulated performance for the week, simulated pay for the week, the accumulated simulated pay for the current phase, percentage of incentive selected, total amount of fixed expenses, total amount of variable expenses, simulated savings amount, simulated interest on

savings amount, simulated loan amount, and the simulated interest on loan amount. From the financial statement screen, the subject could select to display their expenses by pressing "e" on the keyboard, look at the pay table by pressing "p," or continue to the next simulated week by pressing "n." If "n" was selected, then the simulation proceeded to a transitional screen that displayed the message "Continue to Next Week," followed by the computer repeating the procedure of selecting the subject's simulated performance.

The phases changed as described in the "Experimental Design" section. When each phase change occurred, the computer reset all simulated financial variables to zero, except the session savings amount, and displayed the current simulated expense condition on the screen. This process continued until all phases had been completed.

When the subjects completed Experiment 1, the computer displayed the amount of money that the subject received and beeped to inform the experimenter that the subject had completed the study. Subjects were then asked to complete a four-question survey used to determine (1) if interactions between subjects outside of the laboratory may have influenced responding, (2) his/her perceived understanding of the independent variable, (3) his/her perceived understanding of the dependent variable, and (4) whether boredom influenced their responding (Appendix G). The experimenter then debriefed the subject and paid him/her $10 for participation.

Experiment 2

All aspects of the simulation were the same as Experiment 1, except the amount of simulated pay that could be earned under each pay type was held constant at $2000 and the percentage of simulated expenses was manipulated. Four subjects (5, 6, 7, 8) participated in Experiment 2.

Simulated Pay

Table 3 displays the total amount of weekly pay that subjects could receive based on the simulated pay system selected and their simulated work performance in Experiment 2. Total earnings equal the total amount of money that subjects would earn per month based on the pay system selected. There was a 0.50 probability that a subject's performance would be low or high for each simulated pay condition. Thus, the total expected monthly earnings for the hourly condition was $2000.00, (0.50 X $2000 (low performance) plus 0.50 x $2000.00 (high performance)). The specific calculations used to arrive at these amounts are contained in Appendix D.

Independent Variable

The independent variable, the percentage of monthly expenses relative to total earnings, had two values for Experiment 2: 85% and 95%. These values were used in previous studies that assessed the feasibility of using computer

Table 3

Simulated Weekly Pay for Experiments 2 and 3

Hourly Pay				
Performance	Base Pay	Incentive Pay	Weekly Pay	Hourly Rate
Low	$500	$0	$500	$12.50
High	$500	$0	$500	$12.50
Base Pay Plus Incentive				
Performance	Base Pay	Incentive Pay	Weekly Pay	Hourly Rate
Low	$375	$0	$375	$9.38
High	$375	$250	$625	$15.63

simulation to investigate subject preference of pay types (Oah, 1989; Sundby, et al., in press). Oah (1989) selected these values based on a consumer expenditure survey (Norwood, 1985) that revealed that urban consumers with incomes of $20,000 to $29,000 spent approximately 96% of their annual income, while consumers with incomes of $30,000 or more spent approximately 85% of their annual incomes. Table 4 shows the total amount of expenses, for each expense percentage condition, across each simulated pay condition.

Simulated expenses consisted of fixed expenses and variable expenses. Fixed expenses remained constant at $1200 and $1500 for the 85% and 95% expense conditions respectively. Fixed expenses consisted of housing cost,

Table 4

Total Amount of Monthly Expenses for Experiment 2

Pay Type	Total Pay	85% Expense Condition	95% Expense Condition
Hourly Pay	$2000	$1700	$1900
Base Pay Plus Incentive	$2000	$1700	$1900

transportation cost, and food cost. Variable expenses consisted of medical cost, entertainment cost, and unexpected expenses. The variable expenses were calculated by the computer such that the total simulated monthly expenses of subjects would equal 85% or 95% of their total simulated monthly income. An example of the simulated expenses for Experiment 2 are shown in Table 5.

Table 5

List of Fixed and Variable Expenses for Experiment 2

Simulated Fixed Expense	
85% Expense Condition	95% Expense Condition
Housing Cost = $500	Housing Cost = $700
Food Cost = $200	Food Cost = $200
Transportation = $500	Transportation = $600
Simulated Variable Expenses *	
85% Expense Condition	95% Expense Condition
Medical Cost	Medical Cost
Entertainment	Entertainment
Unexpected Cost	Unexpected Cost

* Amounts varied for simulated variable expenses and were determined by the computer.

The expense condition changed once stable responding had occurred. Stable responding was defined as hourly pay or base pay plus bonus being selected for four consecutive pay periods. Once all phases were completed for Experiment 2, the "End of Session" screen appeared.

Experiment 3

The subjects who participated in Experiment 2 also were used in Experiment 3. All variables for Experiment 3 were the same as for Experiment 2, except the expense condition values were changed to 50% and 100%. Fixed expenses remained constant at $750 and $1500 for the 50% and 100% expense conditions respectively. Table 6 displays the total amount of expenses for each expense percentage condition, across each simulated pay condition. An example of the simulated expenses for Experiment 3 are shown in Table 7.

Table 6

Total Amount of Monthly Expenses for Experiment 3

Pay Type	Total Pay	50% Expense Condition	100% Expense Condition
Hourly Pay	$2000	$1000	$2000
Base Pay Plus Incentive	$2000	$1000	$2000

When the subject had completed Experiment 3, the computer displayed the amount of money that the subject received and beeped to inform the experimenter

Table 7

List of Fixed and Variable Expenses for Experiment 3

Simulated Fixed Expense	
50% Expense Condition	100% Expense Condition
Housing Cost = $400	Housing Cost = $800
Food Cost = $150	Food Cost = $200
Transportation = $200	Transportation = $500
Simulated Variable Expenses *	
50% Expense Condition	100% Expense Condition
Medical Cost	Medical Cost
Entertainment	Entertainment
Unexpected Cost	Unexpected Cost

* Amounts varied for simulated variable expenses and were determined by the computer.

that the subject had completed the study. At this point, as with Experiment 1, the subject was asked to complete a four-question survey used to determine (1) if interactions between subjects outside of the laboratory may have influenced responding, (2) his/her perceived understanding of the independent variable, (3) his/her perceived understanding of the dependent variable, and (4) whether boredom influenced their responding (Appendix G). The experimenter then debriefed the subject and paid him/her $30 for participation.

Experimental Design

A within-subject counterbalanced reversal design was used. For each experiment, two subjects were exposed to an ABAB sequence and two subjects to an BABA sequence, where A and B correspond to the experimental treatments for each experiment. Subjects were exposed to each experimental condition until stable responding occurred. Stable responding was defined as the same pay type being selected for four consecutive periods. All sessions lasted approximately two hours.

CHAPTER III

RESULTS

Subjects 1, 2, 3, and 4 completed Experiment 1. In Experiment 1, the independent variable was the maximum amount of "simulated" pay that could be earned under each pay type (described above). Subjects 4, 5, 6, and 7 completed Experiments 2 and 3. In Experiments 2 and 3 the independent variable was the expense percentage (described above). Since incentive conditions were in effect for simulated 3-month periods, data are plotted for incentive periods, rather than simulated months.

Experiment 1

The data for Experiment 1 are displayed in Figure 1. Subjects 1 and 2 were exposed to the High Incentive-High Hourly-High Incentive-High Hourly pay sequence, while Subjects 3 and 4 were exposed to the High Hourly-High Incentive-High Hourly-High Incentive pay sequence. All subjects' responding was controlled by the manipulations of the maximum simulated pay amounts. Subjects selected the pay type that offered the maximum amount of simulated pay. For example, if hourly pay resulted in a maximum simulated pay of $4000, as compared to $2000 for base pay plus incentive, then subjects selected hourly pay.

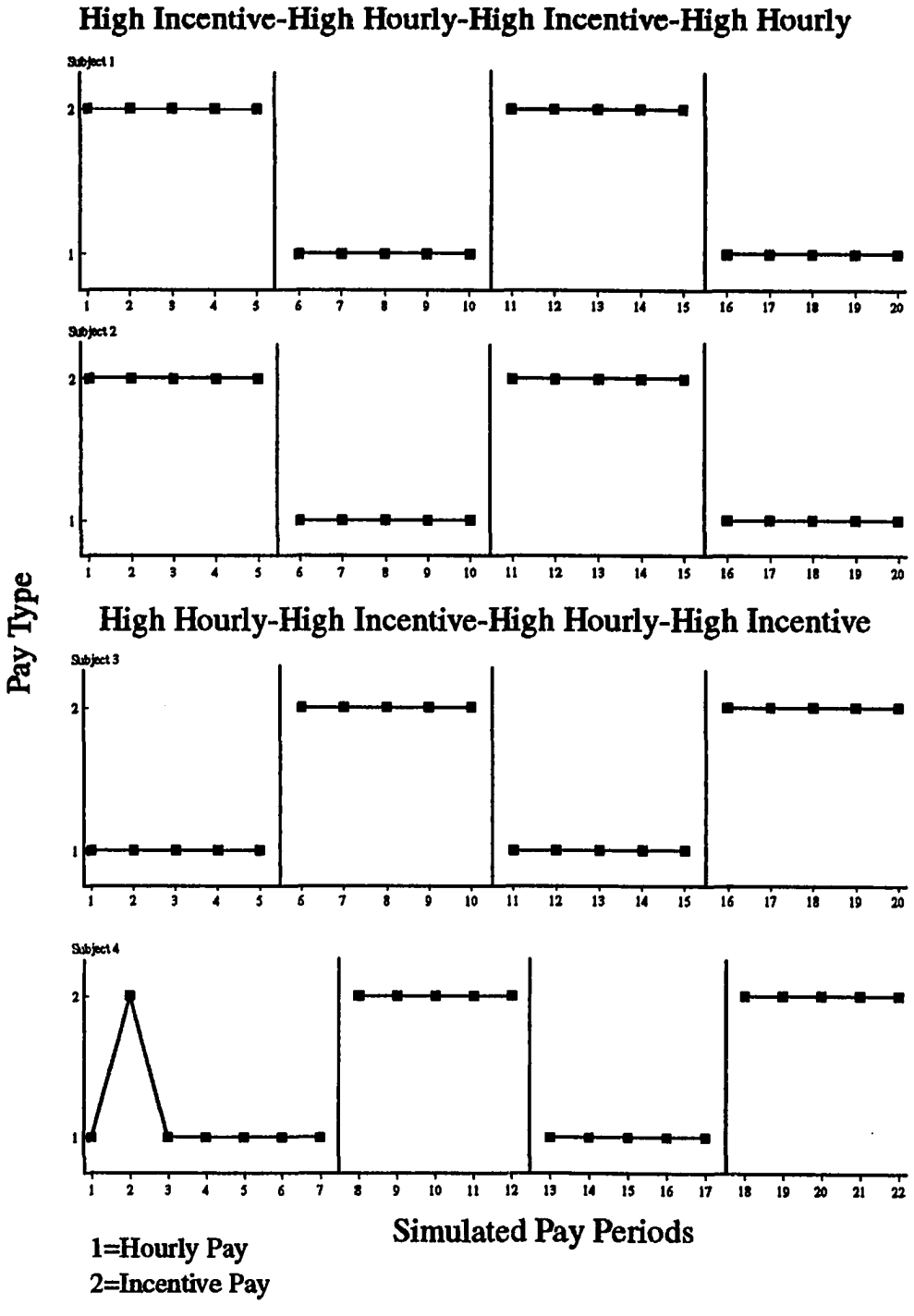

Figure 1. Subjects' Pay Type Selections Across Phases for Experiment 1.

Experiment 2

The data for Experiment 2 are displayed in Figure 2. Subjects 5 and 6 were exposed to the 85%-95%-85%-95% expense sequence, while Subjects 7 and 8 were exposed to the 95%-85%-95%-85% expense sequence. The expense conditions in Experiment 2 did not obviously control subjects' responding. Table 8 shows the breakdown of pay system selections for each subject in Experiment 2. These data evidence considerable variability in responding, with hourly and base pay plus incentive being selected about equally often under both exposure sequences for the subjects as a group. Subjects 6 and 8 consistently selected hourly pay, while Subjects 5 and 7 selected base pay plus incentive.

Experiment 3

The data for Experiment 3 are displayed in Figure 3. Subjects 5 and 7 were exposed to the 50%-100%-50%-100% expense sequence, while Subjects 6 and 8 were exposed to the 100%-50%-100%-50% expense sequence. Table 9 shows the breakdown of pay systems selected for each subject in Experiment 3. As in Experiment 2, there was no apparent control of responding by manipulations of the expense percentage.

Only Subject 3 responded as hypothesized under these conditions. That person selected hourly pay when the expense condition was 100% and base pay plus incentive when the expense condition was 50%. The other subjects responded with a great deal of variability and no obvious patterns were evident.

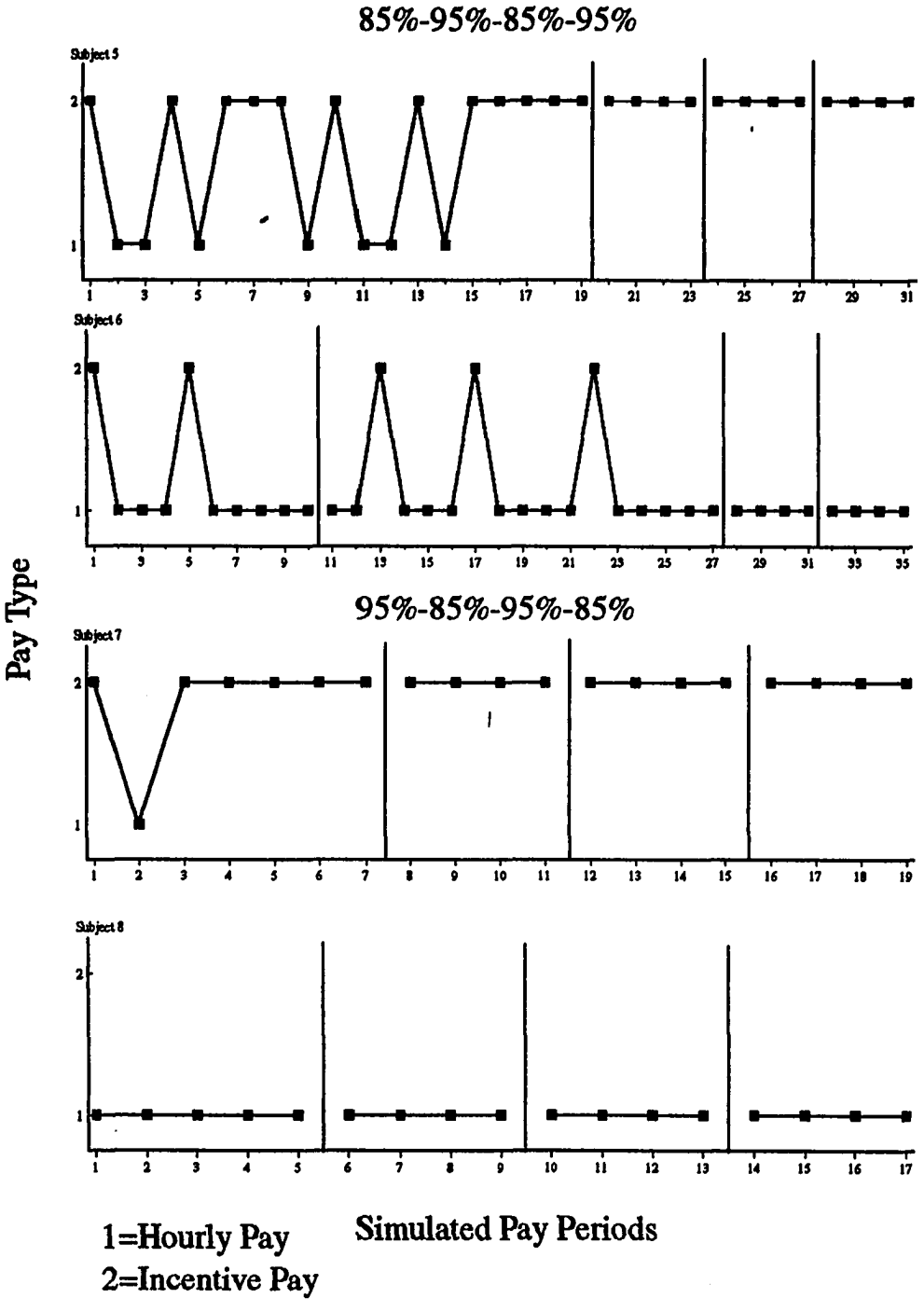

Figure 2. Subjects' Pay Type Selections Across Phases for Experiment 2.

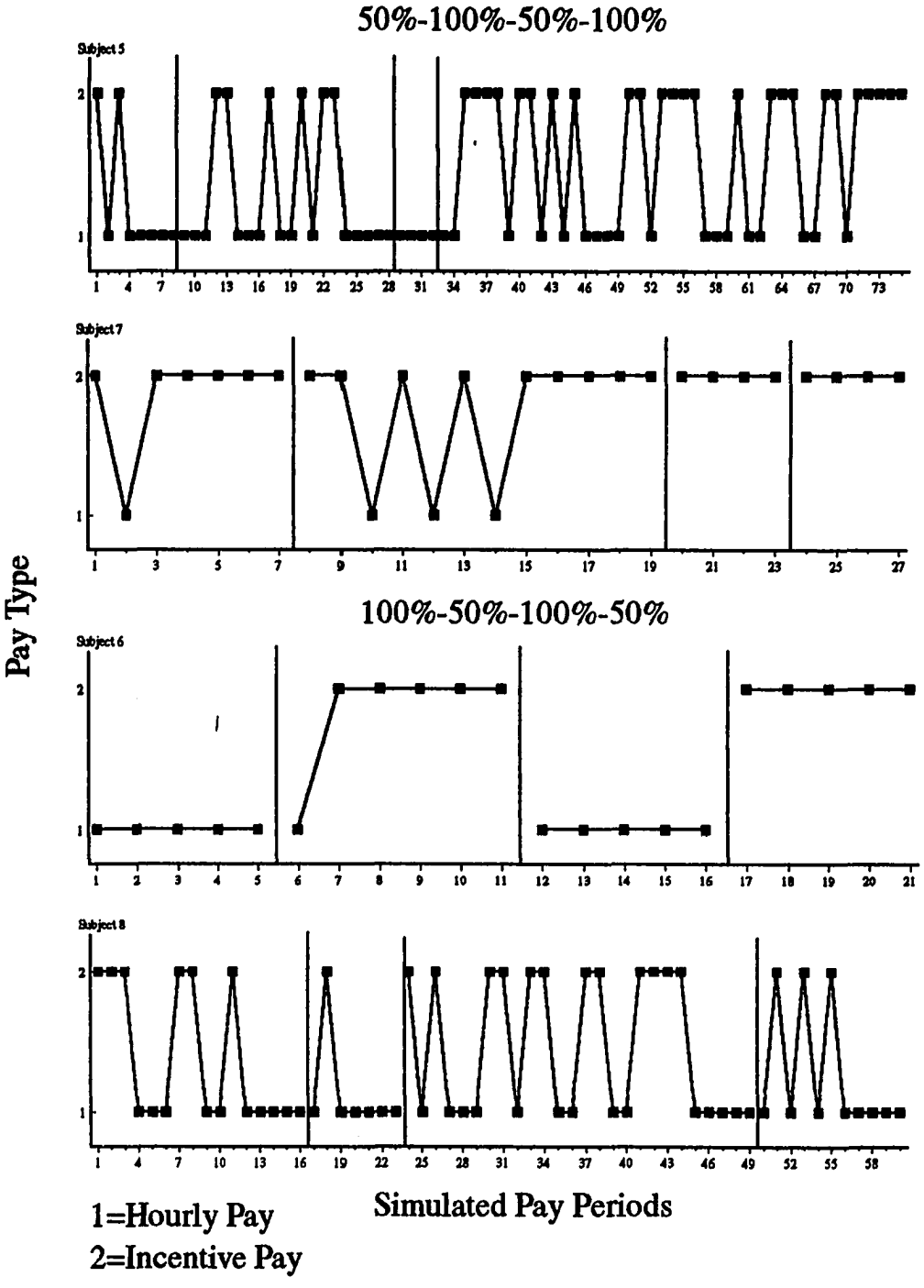

Figure 3. Subjects' Pay Type Selections Across Phases for Experiment 3.

Table 8

Breakdown of Pay System Selections for Experiment 2

Subjects' Selections Under the 85% Expense Condition					
	Subjects				
Pay System	5	6	7	8	Total
Hourly	7	12	0	8	27
Incentive	16	2	8	0	26
Subjects' Selections Under the 95% Expense Condition					
	Subjects				
Pay System	5	6	7	8	Total
Hourly	0	18	1	9	28
Incentive	8	3	10	0	21

Questionnaires

Subjects 1, 2, 5, 6, 7, and 8 responded correctly to all questions on the selection quiz, while Subject 3 missed two questions (6 and 7) and Subject 4 missed one question (7). Subjects 2 and 4 were allowed to participate with less than 100% accuracy because the experimental conditions they were exposed to in Experiment 1 did not require a thorough understanding of percentages. All subjects demonstrated at least rudimentary understanding of basic percentages and finances.

All subjects responded correctly to the phase change questions presented at the beginning of each phase, suggesting they were aware of the experimental conditions in effect and understood how these conditions affected the simulation.

Table 9

Breakdown of Pay System Selections for Experiment 3

Subjects' Selections Under the 50% Expense Condition					
	Subjects				
Pay System	5	6	7	8	Total
Hourly	10	0	1	11	22
Incentive	2	10	10	4	26
Subjects' Selections Under the 100% Expense Condition					
	Subjects				
Pay System	5	6	7	8	Total
Hourly	32	10	3	24	69
Incentive	31	0	13	18	62

Pertaining to the after session questionnaire, all subjects responded "no" when asked if anyone other than the experimenters had discussed this study with them. This suggest that they had not discussed the experimental conditions of the study with other subjects during or prior to their participation. All subjects responded "yes" to questions two and three, stating that they understood the expense and incentive conditions. Only Subject 4, from Experiment 1, reported that boredom influenced responding, although data for this subject do not support this conclusion. Subject 4 had the same general response pattern as the other three subjects in Experiment 1.

Summary

In summary, the amount of maximum simulated pay available under each pay type did control subjects' responses in Experiment 1. Subjects selected the pay type that resulted in the greatest amount of simulated pay. Manipulating the expense percentages in Experiments 2 and 3 did not obviously control responding. Subjects did not respond systematically to manipulations of the independent variable in these studies.

CHAPTER IV

DISCUSSION

This study was the third in a series of studies (Oah, 1989; Sundby et al., in press) examining the feasibility of using a simulation to investigate factors that may affect subject/worker preference for different types of incentive pay. My assumption, as in previous research (Sundby et al., in press), was that manipulations of the independent variables would control the subjects' selection of simulated pay type, thus demonstrating the sensitivity of the simulation. If such control were demonstrated, it would provide two types of important information. First, it would confirm that simulations could be used to investigate variables that affect preference for different forms of incentive pay, providing a foundation for further investigations using simulations. Second, the data collected may provide some insight into factors that affect preference for certain pay types, enabling compensation analyst to design pay systems that not only increase productivity, but also employee satisfaction with the pay system.

The data from this study provided some important information. First, the data from Experiment 1 demonstrated that the computer simulation is sensitive to some independent variables. All subjects' responding was controlled by manipulations of the amount of simulated pay that could be earned. They selected

the pay type that had the greater payoff. For example, when hourly pay resulted in the greater amount of simulated pay, subjects selected the hourly pay system. Conversely, when base pay plus incentive result in the greater amount of simulated pay, they selected base pay plus incentive. This systematic control of responding suggests that manipulation of variables within a simulation can control responding.

Second, the results from this study support previous research that has shown that higher pay increases pay-level satisfaction (e.g., Fossum, 1979). These results suggest that compensation analyst should consider the importance of pay-level when designing payment systems. According to these results, subjects select (or prefer) the system that offers the most compensation. Moreover, the results of this study are consistent with previous findings, because the simulation appears useful for investigating some of the variables associated with pay system preference or pay satisfaction.

Although manipulations of the expense conditions in Experiments 2 and 3 did not systematically control subject responding, they provide some valuable information. These data tend to support the conclusion that subjects did not prefer one pay system over the other, when the maximum amount of simulated compensation is constant across pay systems. Even when there was a major difference between the simulated expense conditions (50% and 100%), 3 of the 4 subjects did not respond in a systematic way to the manipulations, suggesting that the simulated expense conditions were not a salient variable in their selection of pay type. One possible explanation for this could be that, "in the real world," we

are not taught to look at the amount of our expenses and then select the type of pay system. Generally, people budget expenses based on their income. Since the amount of expenses were calculated as a percentage of total pay, subjects may have tried to maximize their simulated earnings by experimenting with the pay types, thus producing variability in their responses.

Subject 4 in Experiment 1 demonstrated the importance of this type of assay for investigating the factors that may be associated with preference or "satisfaction" with pay systems. As stated earlier, many question the use of self-report measures (e.g., Ajzen & Fishbein, 1977; Lockhart, 1979). Often, how people report they will respond is quite different than their actual behavior. On the self-report questionnaire, Subject 4 responded that "boredom had influenced responding." However, as can be seen from the data, Subject 4 responded in the same manner as Subjects 1, 2, and 3, further verifying the importance of not relying solely on self-report data.

There are certain limitations associated with this study and with this form of research in general. It is important to consider that a person's selection of a certain pay type, given certain contrived variables, does not necessarily mean they are more "satisfied" with that pay system. Money is a powerful generalized conditioned reinforcer that may in the short run control more behavior than other factors. It may be that subjects are more satisfied with one type of pay system, yet when given the option of selecting a compensation system to work under, they select the system with the greatest payoff. If they were actually to work under the

two pay types in this study for an extended period of time, they may actually prefer a pay system different than the one selected under these simulated conditions.

Also, it must be stressed that the data collected were in a laboratory setting and therefore may not generalize to "real world" work settings. Undergraduate students serving as subjects may not reliably represent the general work population. Although undergraduate college students have financial responsibilities, they are seldom of the same magnitude of those that beset individuals with families and children. Further, this is a laboratory simulation, not a real work condition. Subjects may respond entirely different if their actual means of support were at risk or they were performing a repetitive task on a full-time basis.

For others who may be interested in this line of research, three suggestions are offered.

1. Keep the simulation as simple as possible. The more complex the simulation the harder it is to determine what is controlling responding.

2. Be sure to demonstrate stable responding under a given set of conditions, then manipulate one variable at a time. In other words, be very concerned with the design of your study.

3. Be careful in the selection of subjects. If needed, develop a test to determine if possible subjects have the skills and knowledge needed to understand the variables associated with the simulation. Simulations may be a viable means of investigating the factors that may influence subject preference for certain pay

systems, but they are not necessarily sensitive or ecologically valid measures of behavior.

Appendix A

Incentive Simulation Quiz

Incentive Simulation Quiz

1. What is 75% of $100.00?_____

2. What is 50% of $250.00?_____

3. Fifty dollars is _____% of $200.00.

4. Seventy-five dollars is _____% of $150.00.

5. If you earn $100.00, and if you spend 50% of this, how much would you spend?_____

6. If you earn $125.00, and 20% of this total pay goes toward expenses, how much would you owe in expenses?_____

7. Assume you are in a job and are being paid based on how well you perform. The total amount that you can expect to earn is referred to as your total expected earnings. If your total expected earnings is $500.00, and you owe 95% of your total expected earnings in expenses, how much do you owe? _____

Appendix B

Western Michigan University's Human Subjects Institutional Review Board Approval

Human Subjects Institutional Review Board

Kalamazoo, Michigan 49008-3899
616 387-8293

WESTERN MICHIGAN UNIVERSITY

Date: September 21, 1994

To: Stephen Sundby

From: Richard Wright, Interim Chair

Re: HSIRB Project Number 94-08-10

This letter will serve as confirmation that your research project entitled "Evaluation of a computer simulation to assess subject preference for different types of incentive pay" has been **approved** under the **full** category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note that you must seek specific approval for any changes in this design. You must also seek reapproval if the project extends beyond the termination date. In addition if there are any unanticipated adverse or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: Sept. 21, 1995

xc: Poling, PSY

Appendix C

Informed Consent Form

Western Michigan University, Department of Psychology

Evaluation of a Computer Simulation to Assess Subject Preference for Different Types of Incentive Pay: Part Two

Alan Poling and Stephen Sundby

Informed Consent for Participation in a Research Study

My name is Stephen Sundby and I am a graduate student in the Department of Psychology at Western Michigan University. You are being invited to participate in an experiment that will fulfill my dissertation requirement for a Doctor of Philosophy degree in Applied Behavior Analysis. The purpose of this study is to investigate the feasibility of using a computer simulation to determine worker preference for various types of pay systems.

As a participant in this study, you will be asked to attend three sessions that last approximately two hours each, and to work with a computer. The computer will be running a program that will simulate a financial pay situation. During the simulation, you will be asked to select from various payment schedules given certain financial variables.
There are no apparent benefits for participation, except the $30 in compensation you will receive upon completion of the three experimental sessions.

There are no apparent risks to you. However, As in all research, there may be unforeseen risks to the participant. If an accidental injury occurs, appropriate emergency measures will be taken; however, no compensation or treatment will be made available to the subject except as otherwise stated in this consent form.

All information obtained in this study will remain strictly confidential. When the results are presented, no one will be able to identify you. A number will be randomly assigned to you and this number will be used when referring to your data. By signing this informed consent, you will be giving permission for data obtained in this study to be used in my dissertation and in professional presentations and publications.

Your participation in this study is entirely voluntary. You may discontinue participation in the experiment at any time without repercussions. Your participation or withdrawal will not affect grades in any of your classes.

If you have any questions concerning this study, please contact me at 387-4503. Dr. Alan Poling, the faculty advisor for the study, may be contacted at 387-4483. The participant may also contact the Chair, Human Subjects Institutional Review

Board (387-8293) or the Vice President for Research (387-8298) if questions or problems arise during the course of the study.

YOUR SIGNATURE BELOW INDICATES THAT YOU UNDERSTAND THE ABOVE INFORMATION AND AGREE TO PARTICIPATE IN THE STUDY. You should keep the attached copy of this form.

_____ _____

Participant Signature Date

Appendix D

Calculations of Total Expected Earnings

Calculations used to obtain Total Simulated Pay.

Experiment 1 (Condition 1-High Incentive Pay)

Simulated Hourly Pay:

(0.50*500)	+	(0.50*500)	*4	=	2000
Low Prod.		High Prod.	Weeks		

Simulated Base Pay Plus Incentive:

(0.50*900)	+	(0.50*1100)	*4	=	4000
Low prod.		High Prod	Weeks		

Experiment 1 (Condition 2-High Hourly Pay)

Simulated Hourly Pay:

(0.50*1000)	+	(0.50*1000)	*4	=	4000
Low Prod.		High Prod.	Weeks		

Simulated Base Pay Plus Incentive:

(0.50*450)	+	(0.50*550)	*4	=	2000
Low prod.		High Prod	Weeks		

Experiments 2 and 3

Simulated Hourly Pay:

(0.50*500)	+	(0.50*500)	*4	=	2000
Low Prod.		High Prod.	Weeks		

Simulated Base Pay Plus Incentive:

(0.50*375)	+	(0.50*625)	*4	=	2000
Low prod.		High Prod	Weeks		

Appendix E

Computer Instructions to Subjects

PLEASE READ THE FOLLOWING INSTRUCTIONS CLOSELY!

PURPOSE

The purpose of this study is to investigate the feasibility of using a simulation to determine worker preference for various pay systems.

MAIN TASK

The computer simulation will guide you with prompts throughout the session. The FINANCIAL STATEMENT SCREEN will display the appropriate keys for you to press to access vital information.

Assume you are working as an assembly line worker for a major automobile manufacturer and you receive your pay every week. Your pay consist of base pay that you receive regardless of performance and incentive pay that can be earned when you perform above average. YOUR MAIN TASK WILL BE TO SELECT THE TYPE OF INCENTIVE PAY EITHER HOURLY (0%) OR BASE PAY PLUS INCENTIVE THAT YOU WANT IN EFFECT. You can determine the amount of simulated pay for each performance level by pressing the appropriate key at the Financial Statement Screen and looking at the pay table. You may look at the pay table as often as you like.

Simulated pay will be placed in an account until time to pay simulated monthly expenses. You will be prompted by the computer to select the pay system at the beginning of the simulation and thereafter every three simulated month.

SIMULATED WORK PERFORMANCE

There are two simulated work performance levels: low and high. Your simulated work performance will be determined by a number selected by the computer. This number will correspond with either low or high simulated work performance. A number will be selected for each simulated week and your simulated work performance will be displayed on the Financial Statement Screen.

SIMULATED EXPENSES

After four simulated weeks you will have to pay your monthly expenses which consist of fixed expenses and variable expenses. You can look at the amount of simulated expenses by pressing the appropriate key listed on the Financial Statement Screen. The fixed expenses remain constant while the variable expenses change. The payment of these expenses will be performed by the computer and displayed to you on the Financial Statement Screen. If you have more expenses

than simulated funds available then you will receive a loan at 20% interest to pay the simulated expenses.

YOUR COMPENSATION

Your monetary compensation for completing the study will be $30 ($10 for Experiment 3).

PLAY MONEY

Please remember that all money associated with the computer simulation is PLAY MONEY!

DEMONSTRATION

There will be a demonstration phase of the program prior to your beginning. During the demonstration you will be required to press a key to continue. Please pay close attention to the monetary amounts and operation of the simulation during the demonstration phase. PLEASE ASK THE EXPERIMENTER IF YOU DO NOT UNDERSTAND ANY OF THE INSTRUCTIONS OR IF YOU HAVE ANY QUESTIONS ABOUT THE SIMULATION?

PLEASE TAKE YOUR TIME AND DO THE BEST YOU CAN!

THE DEMONSTRATION WILL BEGIN WHEN YOU EXIT!

Appendix F

Simulated Financial Statement Screen

FINANCIAL STATEMENT SCREEN

Pay Type: HOURLY PAY Expense Percentage: 95%

Your performance for week 1 was HIGH.

Your Pay for Week 1 = $ 500

Current Savings = $ 500

COMMANDS: <P>ay Table OR <N>ext Week

PRESS ONE OF THE KEYS IN BRACKETS!

Appendix G

After Session Questionnaire

After Session Questionnaire

1. At anytime did anyone other than the experimenters talk to you about the experimental conditions of this study?
   YES___ NO___

2. Did you understand the expense conditions?
   YES___ NO___

3. Did you understand the incentive conditions?
   YES___ NO___

4. Did boredom influence your responses?
   YES___ NO___

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