Masters' Series

Are We Motivated by Money? Some Results From the Laboratory

by Alyce M. Dickinson, PhD

For about 20 years now, my students and I have been investigating how individual monetary incentives affect performance. Our research, for the most part, has been *bridge* research, that is, laboratory simulations that address practical questions derived from organizational settings. Although questions always arise with respect to whether results from the laboratory are relevant to actual work settings, we have been encouraged by empirical reviews of incentive studies. To date, the authors of all those reviews (Jenkins, 1986; Jenkins, Mitra, Gupta, & Shaw, 1998; Hantula, 2001), although few in number, have concluded that the results of field studies, laboratory studies, and laboratory simulations are similar, and hence that results from the laboratory do have relevance for the real world. We, too, have found similarities between the results obtained in our laboratory investigations and our applied work.

My own interest in monetary incentives came from incentive systems that were implemented at Union National Bank in Little Rock, Arkansas. With guidance from William Abernathy, a Memphis-based consultant, the bank's executives (H. Hall McAdams III and Wayne Dierks) began implementing monetary incentive systems in the mid 1970s. By the early 1980s, 75 individualized monetary incentive programs had been installed, covering about 70% of the bank's 485 employees (Dierks & McNally, 1987). During that time, the bank hired Kathleen McNally, a behaviorally trained psychologist, to oversee that work. In 1987, Dierks and McNally described the success of their incentive programs:

> In 1985, $1 million was paid in incentive payments on a $9 million annual payroll. But it's more than worth it. Using these principles, we have increased productivity 200%–300%. Our net profit per employee is $11,000 per year while other Little Rock banks show $5,700 and $4,200. (p. 61)

Quite creatively, they even applied incentive management to increase ATM use by their customers (McNally & Abernathy, 1989).

While the incentive systems were well received by employees and clearly profitable, the bank's executive team wanted to refine them. Yet they could not locate empirical studies to help them. I was impressed with their efforts and, in consultation with them, began to research some of the questions they posed. Little did I know then that this would occupy me for the next 20 years.

My search of the literature led me to an excellent article by Opsahl and Dunnette (1966) entitled "The Role of Financial Compensation in Industrial Compensation." I consider it a classic in the field and highly recommend it to anyone who is interested in compensation and incentive systems. In that article, the authors stated, "Strangely, in spite of the large amounts of money spent and the obvious relevance of behavioral theory for industrial compensation practices, there is probably less solid research in this area than in any other field related to worker performance" (p. 94).

Although case studies and the few experimental studies that existed supported the effectiveness of pay-for-performance plans, Opsahl and Dunnette (1966) appealed to researchers to conduct laboratory studies so that the effects of incentive plans could be isolated from other administrative and organizational changes that typically accompany their implementation. In an article designed to assess the extent to which results of laboratory incentive studies generalize to actual work settings, Jenkins (1986), 20 years later, expressed similar surprise:

> It is no wonder that two decades ago, Opsahl and Dunnette (1966) and [others] bemoaned the sorry state of experimental data on the role of money in improving performance…. It is surprising that the situation still has not changed much…. In some ways, it is *amazing* [italics added] that we can be discussing the generalizability of laboratory findings to field settings, given that there are so few findings to generalize from or to. (pp. 167-168)

Having confirmed what the Union National Bank executives told me about the need for empirical research, I forged ahead. Union National Bank—specifically, Kathleen McNally—gave me a list of questions to pursue. Interestingly, Opsahl and Dunnette (1966) identified those same questions, and more. I began with questions that appeared on both "things to do" lists, specifically, the relation "between the amount of money and the amount of behavior money motivates" and between the percentage of base pay earned in incentive pay and the amount of behavior that percentage motivates.

When I began this research, only a few empirical studies had been conducted. Jenkins (1986) was able to identify only 28 systematic investigations for his review. That is still largely true today. In 1998, 32 years after Opsahl and Dunnette (1966) wrote their article and 12 years after Jenkins wrote his, Jenkins and colleagues (1998) were able to identify only 39 studies for their statistical meta-analytic review. (They examined whether individual monetary incentives were related to performance and found that they were, with an overall effect size of .34). This is in spite of the fact that surveys over the past decade have consistently revealed that approximately 90% of Fortune 1000 companies have some type of individual incentive plan (Ledford, Lawler, & Mohrman, 1995). And a recent Hewitt survey (2002) found that 47% of 1045 companies surveyed had individual incentive systems wherein rewards were based on specific employee performance criteria.

Before describing some of our research, however, I want to start with a caveat about monetary incentive systems: "A careful examination of the criticisms of monetary pay-for-performance systems indicates not that they are ineffective, but that they are *too* effective" (Baker, Jensen, & Murphy, 1988, p. 597).

And therein lies the problem. You do get what you pay for, and thus you better be paying for the right thing!

Different pay plans yield different results, and companies adopt them for different reasons. Any compensation system must be aligned with the strategic goals of an organization (Milkovich & Stevens, 2000). In an excellent article that addressed strategic design, Ledford and Hawk (2000, p. 32) state, "One reason that designing compensation systems is so difficult is that these systems can have many different and conflicting goals." Certainly, individual monetary incentives are not always appropriate; they are not a panacea. Yet when priority goals include improving and maintaining high levels of individual performance, they can be very effective (Bucklin & Dickinson, 2001).

I have restricted my work to investigating the effects of individual incentives (and recently, also small group incentives) because of my interest in the Union National Bank incentive systems and, in addition, because of my background in behavioral psychology. Unlike some other kinds of variable pay plans, individual monetary incentive systems have several features that have been found to increase the general effectiveness of rewards and consequences (Braksick, 2000; Brown, 1982; Bucklin & Dickinson, 2001; Daniels, 1989; Dierks & McNally, 1987; O'Brien & Dickinson, 1982).

Accelerated Incentive Pay Versus Linear Incentive Pay

Union National Bank used an exponential pay-out function rather than a linear pay-out function for many of their incentive systems. In a linear pay-out function, the amount of the per piece (or per unit of work) incentive remains the same regardless of how many units of work the performer completes. In an accelerating or exponential pay-out function, the per piece incentive increases as performance increases; that is, the more a performer completes, the more each part is worth. Colloquially, McNally (personal communication, 1985) describes the rationale as follows: "The faster you run, the harder it is to run faster." From a more conceptual perspective, the question is a question about reward magnitude. As response effort increases, does accelerating piece rate pay affect performance more than linear piece rate pay?

In a study published in 1992, Oah and I compared the relative effects of a linear incentive pay-out function and a 1.5 exponentially increasing pay-out function (the function used most often by Union National Bank). We randomly assigned 40 college students to the linear or exponential pay-out function condition. Each participant attended 15 45-minute sessions. The task consisted of a computerized simulation of a proof operator's job. Checks of differing cash values were presented on the screen, and participants entered the values of the checks using the computer keyboard. The measure of work was the average number of checks completed correctly per session. Participants in the linear pay-out function group earned the same per check incentive regardless of how many checks they completed correctly. In contrast, participants in the 1.5 exponential pay-out function group earned increasingly more per check as their performance increased. For example, participants in both groups earned $2.00 per session for minimum performance (490 checks). However, participants in the exponential pay-out function group earned $5.00 per session for maximum performance (860 checks), whereas those in the linear pay-out function earned only $3.50 for maximum performance.

Participants in the two conditions performed comparably, even though those in the exponential pay-out function group earned significantly more money than those in the linear pay-out function group. These data suggested to us that (a) the amount of money earned in incentives may not affect performance and (b) individuals may perform comparably when they receive linear or exponentially increasing incentive pay. To my knowledge, only one other study (Smoot & Duncan, 1997) has examined this question, and the results, although a bit more ambiguous than ours, were nonetheless similar. Thus, there are no data that I know of that support the contention that accelerating piece rate pay affects performance differently than linear piece rate pay.

Effects of the Percentage of Incentive Pay on Performance

We examined whether the percentage of base pay and total pay earned in incentive pay affected performance in a series of four studies (Dickinson & Gillette, 1993; Frisch & Dickinson, 1990; LaMere, Dickinson, Henry, Henry, & Poling, 1996; Matthews & Dickinson, 2000). In many individual monetary incentive systems, employees receive an hourly base wage and can earn additional money in incentives when their performance exceeds a specified performance standard. Given that the total amount of money that can be earned remains constant, as the percentage of incentive earned in base pay (or total pay) increases, more of an individual's pay becomes dependent on his or her performance. Performance-relevant behaviors increase wages more, and off-task behaviors decrease wages more. Thus, as the incentive percentage increases, the incentives may compete more effectively with consequences for non-work–related tasks and control performance more effectively.

Historically, compensation experts have argued that worker performance will not be affected if incentive pay comprises less than 30% of a person's base pay (Fein, 1970). They have also maintained that performance levels will not be appreciably greater if incentive pay comprises more than 30% of a person's base pay. Similar to other organizations, Union National Bank for the most part had been following this practice. However, that 30% figure was not empirically based. Rather, during World War II, all new incentive plans and changes to existing ones had to be approved by the War Labor Board, which ruled that a 30% incentive to base pay ratio was fair and equitable (Fein, 1970).

In the first study in this series, Carol Frish and I (Frisch & Dickinson, 1990) compared the effects of fixed pay and four different percentages of incentive pay on performance. We randomly assigned 75 college students to one of the five pay groups. Participants in the 0% group (the fixed-pay group) received guaranteed base pay. Participants in the incentive groups also received a base wage, but in addition were given the opportunity to earn 10%, 30%, 60%, or 100% of their base pay in incentive pay. If participants in the incentive groups performed at maximum rates, they could earn the same amount as those in the fixed-pay group. We equalized the total amount of pay that could be earned by participants in the incentive groups by decreasing the amount of the fixed pay they could earn and increasing the amount of the incentive pay they could earn.

The task was a simple assembly task. Participants assembled parts made from bolts, nuts, and washers, and the measure of work was the number of quality parts assembled. Because actual employees often engage in non-work activities, we made a number of alternative off-task activities available to participants and permitted participants to take work breaks whenever they wanted. Each participant attended 15 45-minute sessions. At the end of each session, an experimenter counted the number of parts assembled correctly, plotted it on a graph in front of the participant, and paid the participant in cash.

In what subsequently turned out to be a "lucky break" for us, we had overestimated the number of parts participants could assemble when we designed the pay systems. Because of this, participants in the four incentive groups earned less incentive pay than we had planned, actually earning only 3%, 13%, 25%, or 54% of their base pay in incentive pay.

Participants who received incentive pay assembled significantly more parts than those who received only fixed pay (approximately 18 parts per session, an increase of 26%). Those in the four incentive percentage groups, however,

performed comparably. That is, participants who earned higher percentages of incentives did not perform better.

To determine whether performance was influenced by the total amount of money earned, we compared the average amount of money earned by participants in each of the five groups. There was an inverse relationship between the amount earned and the percentage of incentive, with those in the fixed pay group (the 0% incentive group) earning the most money and those in the 54% incentive group earning the least. When viewed in conjunction with the performance data, these data suggest that performance was not affected by either the total amount of money earned or the per piece incentive (which also varied across the four incentive groups).

We found the above results to be interesting for three reasons. First, participants who earned only 3% of their base pay in incentives performed considerably better than those who received only fixed pay. Particularly striking is the fact that participants in the 3% incentive group earned an average of only $0.11 in incentives per session. Second, higher percentages of incentives did not result in better performance. And third, performance was not affected by the total amount of money earned or the amount of the per piece incentive. Thus, both the incentive percentage and the absolute monetary payoffs appeared to be less important than the contingency between pay and performance.

A few years later my students and I (LaMere et al., 1996) were fortunate enough to have the opportunity to examine the effects of different percentages of incentives in an actual work setting. Participants were 22 roll-off truck drivers. Roll-off truck drivers pick up and deliver large waste disposal dumpsters (10-40 cubic yards in size) to commercial and construction sites.

We divided the drivers into two groups and used a within-subject multiple baseline design across groups for the initial implementation of the incentive system. In a multiple baseline design, baseline or control data are collected over time and then the intervention is introduced at different times for the two groups. If the performance of each group changes when and only when the group is exposed to the intervention, then it is likely that the changes are due to the intervention.

Initially, drivers received only 3% of their *total* pay (rather than base pay) in incentive pay; that is, 97% of their pay was guaranteed. Incentive pay was subsequently increased twice, increasing the incentive percentage to 6% and 9% of total pay. These raises were introduced simultaneously to the two groups because of a management decision to maintain pay equity.

We measured the performance of the drivers for approximately four years. The baseline phases lasted 20 weeks for one group and 34 weeks for the other. The initial incentive phase (3% incentive) lasted 28 weeks for one group and 15 weeks for the other. The two subsequent incentive phases (6% and 9% incentive) lasted 39 weeks and 107 weeks for both groups.

Incentive pay was dependent on above-average weekly performance, which took into account differences in the types of work tasks completed and the number of miles driven. Drivers received their incentive pay as part of their weekly paychecks; however, the amount of the incentives they earned and their hourly pay were listed separately on their pay stubs. In addition, group performance was graphed weekly and publicly displayed.

Small percentages of incentives, as low as 3% of base pay or total pay, can significantly affect performance, but further increases in the percentage do not necessarily produce incrementally higher performance.

Both groups of drivers increased their performance significantly when the incentive system was introduced and maintained high levels of performance for the rest of the study. However, performance did not differ as a function of the incentive percentage. These latter results should be interpreted cautiously because the two percentage increases were introduced at the same time to both groups; thus, alternative explanations cannot be ruled out. For example, some environmental factor such as inclement weather may have suppressed performance during the last two incentive phases. Nonetheless, the results of this applied study support those of our earlier one; specifically, small percentages of incentives, as low as 3% of base pay or total pay, can significantly affect performance, but further increases do not necessarily produce incrementally higher performance.

To date, five studies have examined the effects of different percentages of base pay or total pay earned in incentive pay (Dickinson & Gillette, 1993; Frisch & Dickinson, 1990; LaMere et al., 1996; Matthews & Dickinson, 2000; Riedel, Nebecker, & Cooper, 1988). Incentive percentages have ranged from 0% of base pay and total pay (fixed pay) to 100% of total pay (piece rate pay with no guaranteed base pay). Results have been consistent. Low percentages of incentives have significantly increased performance in comparison to fixed pay, but higher percentages have not

increased performance further. This is not to say, however, that the results of these studies are definitive. Each study has its limitations, and the types of tasks examined have been restricted to production-type tasks. Nonetheless, the results to date suggest that the critical determinant of performance is the contingent relationship between pay and performance, rather than the amount or percentage of incentive pay. At the very least, I believe the results of the studies provide potentially useful information, and certainly grist for additional studies.

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Does Feedback Enhance the Effectiveness of Individual Monetary Incentives?

When Barbara Bucklin and I analyzed the studies that examined different incentive percentages (Bucklin & Dickinson, 2001), we noticed that, in four of the five studies, participants received frequent feedback about their performance in addition to the monetary incentives. Thus, we advised that conclusions regarding the effects of various incentive percentages should be restricted to situations in which incentives are combined with frequent performance feedback. We also thought that the performance feedback might have been the reason why performance did not differ under the various incentive percentages.

A more basic question, however, is whether feedback enhances the effectiveness of monetary incentives. If feedback does not affect performance when individuals receive incentives, then it is unlikely that it could account for the results of the incentive percentage studies. We examined whether performance feedback enhances the effectiveness of individual monetary incentives in a recent study (Bucklin, McGee, & Dickinson, 2003).

Participants were seven college students. We adopted an ABAC within-subject reversal design, in which A = individual monetary incentives, B = individual monetary incentives with feedback, and C = hourly pay with feedback. We used a computerized work simulation task called SYNWORK, which was designed to assess complex performance demands relevant to many work settings (Elsmore, 1994). SYNWORK presented participants with four different work tasks at the same time; an arithmetic task, a memory task, a visual monitoring task, and an auditory monitory task. Participants earned points for correct responses.

The performance of six of the seven participants increased when feedback was added to the monetary incentives. While feedback improved performance, performance did not reverse when the feedback was removed in the second A condition, thus limiting the conclusions that could be drawn. To demonstrate that the improvements were not due to other variables, given the within-subject reversal experimental design, performance would have had to return to the levels seen in the first A phase (incentives without feedback).

It is possible that performance did not reverse because the feedback resulted in higher levels of performance that were then maintained by the additional incentives even though feedback was no longer available. It is also possible that self-produced feedback or environmental changes initiated by the feedback procedure could not be removed. For example, participants reported anecdotally that the feedback made them more aware of the amount of time they spent performing the task, their overall speed of responding, and the amount of time they allocated to the various subtasks, which affected how many points they earned. If true, a within-subject reversal design is not an appropriate experimental design to use.

Those possibilities led us to our next study. Douglas Johnson and I are currently examining whether continuous feedback enhances the effectiveness of incentive pay and hourly pay. We have randomly assigned 120 participants to one of four experimental conditions: (1) individual monetary incentive pay with continuous in-session feedback; (2) individual monetary incentive pay without feedback; (3) fixed pay with continuous in-session feedback; and (4) fixed pay without feedback. The experimental design is thus a 2 x 2 factorial design. The experimental task consists of a computerized check-proofing task, similar to the job of a proof operator at a bank. The main dependent variable is the number of checks that participants correctly process during each session. We are also measuring an additional three variables that may influence the number of checks that participants process correctly: (1) the amount of time participants spend performing the task (rather than alternative non-work tasks that are available); (2) the percentage of checks completed correctly per session; and (3) the rate of check completion (the number of checks completed correctly per minute while performing the experimental task). Each participant will attend one pre-experimental session during which we will assess his or her keyboard proficiency, and six 45-minute experimental sessions. We will use a two-factor ANCOVA to determine whether the average number of checks completed correctly by participants in the four experimental groups differs. The number of checks com-

pleted correctly during the pre-experimental session will be used as a covariate to control for initial differences in keyboard proficiency.

At this time, we have not yet collected enough data to predict the results. I will, however, report preliminary, if not final, results at the ISPI Annual Performance Improvement Conference in Vancouver, British Columbia, Canada in April 2005.

Conclusion

Although our research has its limitations, I hope, at the very least, it may encourage others to pursue research in this area so that 10 years from now we will know considerably more about how financial incentives affect the performance and satisfaction of individuals than we do today. It is also my hope that organizations will use such knowledge to create compensation systems that are not only good for the organization, but good for the employees as well.

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I also want to thank Don Tosti, President of ISPI and a person I have long admired and respected, for giving me the opportunity to talk about my research at the ISPI conference in April 2005 as part of the Masters' Series.

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Master's Statement

What advice would you give someone on the path to becoming a master of his/her field?

I will yet again borrow advice from Dale Brethower (who was my doctoral advisor) and Karolyn Smalley (Brethower & Smalley, 1998) who advocate (a) guided observation, (b) guided practice, and (c) demonstration of mastery. Find an exemplar in your field and seek out the opportunity to work with that person, so that he or she can mentor you and guide you through the three critical learning phases described by Dale and Karolyn. Engage in as many behaviors as you can and practice as much as you can, so that your repertoire can be shaped by others and by your experiences. And, while you are practicing and doing, ask for feedback.