The Effects of Incentive Pay Systems with Tiered Goals on Performance

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THE EFFECTS OF INCENTIVE PAY SYSTEMS WITH TIERED GOALS ON PERFORMANCE

by

Daniel B. Sundberg

A dissertation submitted to the Graduate College
in partial fulfillment of the requirements
for the Degree of Doctor of Philosophy
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THE EFFECTS OF INCENTIVE PAY SYSTEMS WITH TIERED GOALS ON PERFORMANCE

Daniel B. Sundberg, Ph.D.
Western Michigan University, 2015

This study examined the relative effects of three incentive pay systems, piece-rate pay, threshold piece-rate pay, and bonus pay, on performance when individuals were given the same five-tiered performance goals. A fourth system, wage pay, served as a control. The task was a computerized simulation of a medical data entry job and the primary dependent variable was the number of correctly completed patient records. Sixty-six college students were randomly assigned to one of the four pay conditions, and attended one 60-minute covariate session and five 60-minute experimental sessions. Participants in the wage pay condition earned $6.50 per session; those in the three incentive pay conditions earned a base rate of $4.50 per session, and were able to earn up to $3.00 in incentive pay. An analysis of covariance showed no significant differences in performance among any of the four pay groups, or across time. Such findings indicate that organizations may be able to produce gains in performance similar to those found with incentive pay, through the use of tiered goals and feedback. These findings contradict past data that show that performance contingent monetary incentives produce gains in performance above what is seen with wage pay alone. The findings also support a limited body of research that suggests the effects of incentive pay systems may be
strongly influenced by performance goals. Analysis of additional variables, further implications, and future directions for research are discussed in detail.
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INTRODUCTION

Goal-setting has been shown to be a very effective method for creating behavior change. Within the behavior analytic research literature goal-setting has been effectively used in a variety of settings such as manufacturing (Grindle, Dickinson, & Boettcher, 2000; Jessup & Stahelski, 1999), human services (Calpin, Edelstein, & Redmon, 1988; R. P. Johnson & Frederiksen, 1984), and food service (Ludwig & Geller, 2008). In addition, goal-setting has been used to improve a number of critical behaviors in business such as customer service (Loewy & Bailey, 2007; Slowiak, Madden, & Mathews, 2006; Tittelbach, DeAngelis, Sturme, & Alvero, 2007), and sales (Casey, 1990; Ralis & O’Brien, 1987). However, the majority of these studies have implemented goal-setting in conjunction with other intervention variables, which makes a specific analysis of the behavioral function of goals difficult. Reber and Wallin (1984) attempted to separate intervention variables as part of a successful effort to increase behavioral safety performance at a farm machinery manufacturing plant. They did so by introducing training, goal-setting, and feedback as separate components, rather than all at once. These authors found that goal-setting increased performance above training alone, and feedback increased performance even further. But studies that introduce goal-setting in such a way are more the exception than the rule.

Despite the fact that goal-setting is most often combined with other components, there are a number of theories on the behavioral function of goal-setting. Goals have been proposed to function as antecedent stimuli that have been correlated with the availability of reinforcement for goal attainment, as well as conditioned reinforcers (Fellner & Sulzer-Azaroff, 1984). From this view a goal statement is a discriminative stimulus (S^D)
that directly evokes behavior. At the same time goals may also function as conditioned reinforcers when goal attainment has been repeatedly paired with other reinforcers. Goals have also been conceptualized as rules that specify the relation between certain behaviors and consequences (Ludwig & Geller, 2008), also called contingency-specifying stimuli (Schlinger & Blakely, 1987). Such contingency-specifying stimuli would have function altering effects on other stimuli. In this sense a goal would not directly evoke behavior due to a specific conditioning history, but instead would alter motivating operations (MO) (Laraway, Snykerski, Michael, & Poling, 2003) and discriminative stimuli associated with relevant behavior, as well as reinforcers correlated with goal attainment.

Yet another view of goals conceptualizes them through the framework of relational frame theory (RFT) (O’Hora & Maglieri, 2006). The authors state:

According to RFT, when environmental stimuli participate in derived relations with words in presented rules and the functions of those stimuli are transformed such that when a person comes into contact with the transformed stimuli, particular responses may then be controlled by them (i.e., the responses “specified” by the rule). (p.147)

More specifically, goals transform the function of stimuli and bring new responses under the control of these stimuli. Goals have the added characteristic of specifying a particular level of performance, as compared with rules, which may not do so. Goals may transform the function of stimuli by evoking goal directed behavior through self-statements describing the discrepancy between current performance and the goal. Such self-statements may simultaneously create an aversive condition related to the discrepancy,
and may increase the reinforcing effectiveness of stimuli associated with progress towards the goal.

Agnew (1998) discussed goals in terms of motivating operations, proposing that goals have the value-altering effect of increasing the reinforcing effectiveness of consequences associated with a certain level of performance, while also increasing the evocative function of stimuli related to goal attainment and goal-directed behavior. Similar to Fellner and Sulzer-Azaroff (1984), Agnew also stated that goals could have different behavioral functions in different settings and could have multiple functions. That is, a goal can be thought of as a stimulus, and as such can function as an S^D, MO, or both at any given time.

All of these views attempt to identify the way in which goals exert control over behavior. However it is difficult to say with any certainty how goals function without more extensive component analyses.

**Goal-Setting Theory**

Outside of the behavioral literature an even greater body of research exists on goal-setting, particularly in the area of Industrial/Organizational Psychology. The pioneers in this field, Edwin Locke and Gary Latham, provide a thorough compilation of issues in goal-setting theory in their edited book, *New Developments in Goal Setting and Task Performance* (2013b). This body of research encompasses more than 1,000 studies and spans more than 50 years. The authors define a goal as “the object or aim of an action” (p. 4). Goal-setting theory differs substantially from a behavioral account of goals in that it treats goal-directed behavior as rooted in biology, and an innate tendency in organisms, although more complex goal-directed behavior is seen as a function of
volition. They go on to say “goal-setting theory states that the goal itself is the primary source of a person’s motivation” (Locke & Latham, 2013a, p. 4). As previously discussed, behavior analysts envision goals as stimuli that acquire some sort of reinforcing, discriminative, or motivating property, whereas goal-setting theory treats goal attainment as something more innate (2013a, p. 3). Philosophical differences aside, there is still a good deal to be learned from the goal-setting theory literature (O’Hora & Maglieri, 2006).

Locke and Latham (2013a) highlight two primary conclusions that have emerged from this large body of literature: “1. There is a linear relationship between the degree of goal difficulty and performance. 2. Specific, difficult goals lead to higher performance than no goals as well as vague, abstract goals such as ‘do your best’” (p. 5). They go on to explain that goals can be thought of in terms of content and intensity, where “goal content refers to the object or result being sought…goal intensity refers to the effort needed to set a goal, the position of a goal in an individual’s goal hierarchy, and the extent to which a person is committed to goal attainment” (2013a, p. 5). The notion of goal commitment is an important part of the goal-setting literature and will be revisited in greater detail shortly.

**Stretch goals.** Within the domain of goal-setting theory, there is still debate over the most effective way to set goals (Locke, 2004). One type of goal structure that receives much attention is known as the stretch goal. These types of goals are set so that the majority of individuals (roughly 90%) will not be able to reach this performance level (Daniels, 2009; Jeffrey, Schulz, & Webb, 2012). The utility of these stretch goals has been debated over the years. Some point to the successes of companies such as General
Electric in their use of stretch goals (Kerr & Landauer, 2004; Kerr & LePelley, 2013). Advocates use such anecdotes to assert that stretch goals can be beneficial for promoting performance levels that were thought previously unachievable by forcing individuals to devise novel ways to accomplish the task. However, they caution that stretch goals should not be set in areas where success is critical as it sets up a situation where failure is probable.

Others suggest that stretch goals are highly detrimental because very high levels of performance are placed on extinction which is likely to produce decreases in performance (Fellner & Sulzer-Azaroff, 1984; O’Hora & Maglieri, 2006; Tammemagi, O’Hora, & Maglieri, 2013). Daniels and Bailey (2014) even suggest that “repeated failure or repeated exposure to aversive consequences despite continued efforts, leads to learned helplessness” (p. 245). Some goal-setting theorists also caution against the use of stretch goals, and point out that “since stretch goals are set at levels that make 100% attainment very unlikely, the process virtually ensures that organization members will experience a loss of self-confidence and other negative emotions” (Kerr & LePelley, 2013, p. 26). Locke and Latham (1984), too, have discussed the potential adverse effects of setting unattainable goals, stating that:

Nothing breeds success like success. Conversely, nothing causes feelings of despair like perpetual failure. A primary purpose of goal-setting is to increase the motivation level of the individual. But goal-setting can have precisely the opposite effect if it produces a yardstick that constantly makes the individual inadequate. (p. 39)
Finally, some research suggests that performance suffers over time when individuals are given stretch goals (Chow, Lindquist, & Wu, 2001; Fisher, Peffer, & Sprinkle, 2003).

**Tiered goals.** Another type of goal system that has received little attention, yet appears to have potential to capitalize on some of the proposed advantages of a stretch-goal system, is the tiered goal system, or multiple goals with multiple bonuses (Locke, 2004). In a tiered goal system participants receive multiple goal levels for the same performance. For example, a salesperson may need to make 10 sales in a month to earn a performance bonus, but she could earn a larger bonus at 15 sales per month, and an even larger bonus at 20 sales per month. Locke states that such a system may be beneficial in that “highly competent employees who just miss a high-level goal still get rewarded” (Locke, 2004, p. 131). Additionally, it may prevent workers from attempting to cheat the system “because even if they do not attain the top goal level, they can get a bonus for making the next lower level” (p. 131). If our salesperson were to make 18 sales in a month she would miss the top target of 20, however, she would still earn a bonus for reaching 15 sales. Compare this to a stretch goal, where this sales person would earn nothing unless she reaches the highest level of 20 sales per month. A tiered goal system may have the added benefit of creating goals that are more applicable to a wider range of individuals. Little to no modification to the example sales system would be required if we were to add a second salesperson whose performance was around 13 per month. While there are some prescriptions for the number of tier levels to use (Brose, 2009; Jeffrey et al., 2012; Latham & Locke, 2013) there is no research to suggest which is most effective.

Bateman and Ludwig (2003) successfully decreased packing errors in a food distribution warehouse through a piece-rate incentive system combined with what they
terming tiered goals. The incentive system allowed employees to earn pay based on productivity, and penalized them for errors; however employees had the ability to earn back any money lost due to errors. Every two weeks the weekly goal level for errors was decreased, meaning employees needed to make fewer errors per week to earn the incentive. The authors called this goal system a tiered bonus system, however what they described more closely resembles a piece-rate pay system with a changing criterion design (Johnston & Pennypacker, 2009). The key difference between this design and the tiered goal system described previously is that all goal levels are explicitly identified and available during all sessions with tiered goals. Goal levels are presented in a tiered fashion in Bateman and Ludwig; however they are presented across time, and are never available concurrently.

Another study analyzed a customized goal system in which participants were either assigned a single high goal regardless of ability, or a low, medium, or high goal based on individual ability level, as determined in two practice rounds (Jeffrey et al., 2012). Additionally, participants could earn a bonus for attaining their respective goal. High-ability individuals in both the one-goal-for-all condition and the high goal condition unsurprisingly performed the same; however low-ability individuals in the ability-based condition performed significantly better than those of the same ability level in the one-goal-for-all condition. Also, significantly more participants in both the medium and low ability-based goal conditions reached their goal, as compared to those in the one-goal-for-all conditions. These results may be interpreted as showing that low performers benefited more from the ability-based goals because they were put into contact with the reinforcement of reaching the goal more readily than in the high goal condition. They
also noted a downward trend across sessions in performance for both the low- and medium-ability groups when they were assigned the high goal versus an ability-based goal. This indicates that extinction may have taken effect, as repeated attempts to reach the goal yielded no reinforcer. While not explicitly studying tiered goals, such performance appears to support the previous argument that goal levels which more closely match ability level will result in improved performance across a wider range of individuals. A tiered goal system would likely be able to capture such benefits, as performers at all levels would have challenging and achievable goals, and extinction would be less likely to occur, except for individuals consistently below acceptable performance levels.

Despite the potential benefits of a tiered goal system there has been little research on its effectiveness. This is surprising given the frequency with which these goal systems are used in business settings. For example, many airlines offer multi-tier reward programs to customers, where points toward reaching the next level are accumulated by purchasing flights. United Airlines, for example, features a 4-level tiered rewards program whereby customers can earn ever increasing perks for travel related purchases per year in increments of 25,000 miles (Silver, Gold, Platinum, and 1K) (“Premier benefits chart,” 2014). There are even higher goals related to lifetime flying and purchases, the highest of which, flying 4 million miles in a lifetime, could even be considered a stretch goal since the vast majority of people do not reach this goal. While United Airlines likely has large quantities of data on the effectiveness of this system, those data are not made public.

Casinos too have extensive rewards programs for customers, to reinforce gambling at their establishments. Caesars casinos and affiliate casinos give customers the
option to earn “tier credits” that accumulate as a “tier score” and allows patrons to work towards a higher “tier level.” Each level (Gold, Platinum, Diamond, and Seven Star) features different bonuses that customers earn when they reach that particular level (“Total Rewards,” 2014). Further, the payouts for certain behaviors increase with each new performance tier reached. Tiered bonus systems are reportedly used in the investment banking world as well, however information on the specific details of such systems are not made public (Pikulina, Renneboog, ter Horst, & Tobler, 2013, p. 4). Indeed, little information is available on the use of tiered pay systems within organizations; however it is more likely due to the proprietary nature of such systems, rather than their scarcity.

Some behaviorists have used a similar system. For example, one study increased the number of closing tasks completed in a small coffee shop with an intervention package that included a two-tiered bonus system (Pampino, Heering, Wilder, Barton, & Burson, 2004). Employees could earn one lottery ticket for 90% - 99% task completion, and two tickets for 100%. While results did improve, it is impossible to say what effect this tiered bonus system may have had, as there was no control condition.

Daniels and Bailey (2014) describe a performance management matrix that gives individual performers multiple goal levels for each performance identified, and differential outcomes associated with the attainment of each level. This model evolved from an earlier version by Riggs (1986), known as the Organizational Matrix. Abernathy (1996) also described a similar system in which performers are given a high overall goal and as many as 10 sub-goals for each behavior. These systems can easily incorporate
monetary incentives along with the tiered goals, yet there is little research to suggest what sort of incentive system may be most effective in these situations (Locke, 2004).

**Feedback and goal commitment.** In addition to specific goal-setting systems, there are several other variables that have been found to moderate the effectiveness of goals, such as individual ability, performance feedback, situational constraints/resources, personality, affect, and goal commitment. Performance feedback and goal commitment are among the variables that have been found to moderate the effectiveness of goals (Locke & Latham, 2013a). Feedback has been shown to be an effective method for improving performance in the behavior analytic literature (Alvero, Bucklin, & Austin, 2001; Balcazar, Hopkins, & Suarez, 1985). Further, it is now widely accepted that feedback increases the effectiveness of goal-setting and should be provided along with goals (Chhokar & Wallin, 1984; Fellner & Sulzer-Azaroff, 1984; Locke & Latham, 1990, 2002).

However, this introduces some complications when attempting to isolate specific variables. Individuals who perform at high levels, or consistently improve performance, are more likely to receive a greater amount of social vocal/verbal reinforcement from the feedback if evaluative statements are made, as compared to low performers. Research has shown that evaluative feedback can have effects in addition to simple objective feedback (D. A. Johnson, 2013), and that objective feedback may not increase the effectiveness of a monetary incentive system (D. A. Johnson, Dickinson, & Huitema, 2008). Further, Stajkovic and Luthans (2003) found that money, feedback, and social recognition each had significant effects on performance. These studies indicate that the inclusion of evaluative or subjective feedback in the form of praise or specific comments about high
performance introduces a variable that is difficult to control. Frisch and Dickinson (1990) for example, excluded evaluative statements when giving feedback to participants on their performance in a study on pay. This was done to control for the effects of interaction with the experimenters and better isolate the effects of the incentive system of interest.

Within the goal-setting literature the concept of goal commitment is considered to be an “essential moderator” of goal related performance (Klein, Cooper, & Monahan, 2013, p. 65). However, within the field there is disagreement about how to best conceptualize goal commitment. While many define commitment in terms of determination and persistence toward a goal, Klein and colleagues (Klein et al., 2013; Klein, Malloy, & Cooper, 2009) advocate for defining goal commitment as “a volitional psychological bond reflecting dedication to, and responsibility for, a particular target” (p.67). This definition places much greater emphasis on the construct of goal commitment than on its behavioral effects. Yet, “behavior does not always follow from commitment (e.g., when there are competing goals to which one is also committed)” (Klein et al., 2013, p. 68). A relatively high level of goal commitment, accompanied by low levels of performance towards that goal indicates the presence of competing contingencies. In an applied setting, data showing high commitment with low levels of behavior would suggest a different intervention than when low goal commitment was indicated.

Providing incentives has been associated with an increase in goal commitment, however the specific details of such a relationship are unclear (Klein et al., 2013). One study from the behavior analytic literature found that individuals who were rewarded for making a commitment to a performance goal and those who were rewarded for
performance towards that goal performed significantly better than those who committed to the goal, but did not receive any sort of reward (Boyce & Geller, 2001). Additional research on this topic might suggest further ways to more effectively use incentive systems, thus indicating the importance of a system for measuring levels of goal commitment.

The Klein, Cooper, Molloy, and Swanson (2014) unidimensional target-free (KUT) scale of goal commitment has been shown to be a reliable instrument for quantifying commitment. Such a scale may be beneficial in assessing the extent to which an individual is motivated to achieve the various goals in a study. Information on the level of commitment may show the effects of an independent variable across time in terms of changes in commitment, or changes in performance.

Locke and Latham (2013a) identify several factors that make one more or less committed to a goal, including authority, peers, making the goal public, incentives, internal rewards, punishment, and instrumentality. Roughly speaking these are the differential consequences, or agents that provide differential consequences associated with reaching or not reaching a goal. From a behavioral perspective we would expect that these factors would have a large impact on performance, and both the behavioral and non-behavioral research support this view (Alvero et al., 2001; Locke & Latham, 2013b).

**Monetary Incentives**

The interaction between goals and performance contingent monetary incentives demands greater inquiry, as Latham and Locke (2013) state “if there ever was an area begging for empirical research, the issue of goal-contingent bonuses is it” (p. 577). Monetary incentives have been shown to be an effective means of increasing
performance in both lab and applied settings, as shown in six literature reviews that encompass several hundred articles examining various monetary incentive systems (Bonner, Hastie, Sprinkle, & Young, 2000; Bucklin & Dickinson, 2001; Condly, Clark, & Stolovitch, 2003; Garbers & Konradt, 2014; Jenkins, Gupta, Mitra, & Shaw, 1998; Stajkovic & Luthans, 2003). However, few studies have examined the effects of incentives in relation to goals. One study found that monetary incentives led individuals to set higher and more difficult goals (Riedel, Nebeker, & Cooper, 1988). Monetary incentives were also found to increase performance above the effects accounted for by goal-setting alone. Similarly, Pritchard and Curtis (Pritchard & Curtis, 1973) found that monetary incentives had effects on performance outside of those explained by goal-setting alone. These studies suggest that goals and monetary incentives have additive and perhaps interactive effects.

**Monetary Incentive Systems and Goal Difficulty: Interactive Effects**

One of the earliest studies to examine the interaction between goal level and monetary incentives found an interesting effect on performance (Mowen, Middlemist, & Luther, 1981). In this study, participants were divided into either a bonus payment group, where individuals could earn money for reaching their goal, or a piece-rate group where individuals earned money per unit produced, regardless of goal attainment. Goal levels were set at high, medium, or low. The high goal was set to be essentially unattainable, with an expected probability of 0.0 based on pilot data. The medium goal was set with an expected probability of 0.5, and the low goal was set so everyone would be expected to meet it, with a probability of 1.0. They found that individuals in the bonus condition outperformed those in the piece-rate condition in both the low and medium goal
condition. However, when participants were given the high, unachievable goal, those in the bonus condition significantly underperformed those in the piece-rate condition.

Lee, Locke, and Phan (1997) attempted to replicate the findings of Mowen et al. (1981), but with the addition of a wage payment condition. Participants were assigned a high goal with an expected probability of 0.1, a medium goal with an expected probability of 0.5, or a low goal with an expected probability of 0.9. Participants were randomly assigned to one of three payment conditions: flat wage, piece rate per entry, or a bonus for goal attainment (nine conditions total). Again, they found an interaction between goal level and incentive system. Those in the bonus pay conditions underperformed not only those in the piece-rate condition, but those in the wage pay condition as well for both high and low goals. It is important to note that those in the bonus condition received the bonus only if their assigned goal was reached. This again indicates that when goals are set too high performance may drop off; however it also shows that this effect may be dependent on the type of incentive system used. Others have found similar results, suggesting there is an interaction between incentive systems and goal level in terms of task performance (Bonner & Sprinkle, 2002; Fatseas & Hirst, 1992). However, there has never been an examination into the ways in which various incentive systems may interact with a tiered goal system as previously described.

Payment Systems

As noted previously by Locke and Latham (2013b), there are a number of unknowns regarding the effects of various kinds of pay systems and their interaction with goals. Four payment systems, in particular, were explored in this study because of their
relevance to a tiered goal system. Those pay systems are: wage pay, piece-rate pay, threshold piece-rate pay, and goal-contingent bonus pay.

**Wage payment systems.** The wage payment system is a simple and attractive payment system, wherein employees are paid a fixed amount of money over some time period, as either a salary or based on the number of hours worked. Wage systems are beneficial for the organization in that they make budgeting employee expenses simpler than many other systems. In a variable-pay system the amount of money that an individual can earn varies based on his or her individual performance, or the performance of a team, department, division, or other unit. In this type of system there is a degree of uncertainty for the organization in terms of how much money will be needed to cover employee costs in a given time period, whereas that expense is relatively fixed with a wage payment system (Dierks & McNally, 1987; Frisch & Dickinson, 1990). Wage systems are also simpler administratively, in that no complicated pay formulae or performance metrics are required, only a tracking of hours worked and pay rate.

It is not surprising that the wage payment system is the most common type of pay system in the United States with the U.S. Bureau of Labor Statistics reporting that more than 75 million Americans were paid by hourly wage pay (Bureau of Labor Statistics, 2012). Yet this type of pay system has been repeatedly shown to be much less effective than performance-contingent pay systems. One review examined the effectiveness of various types of incentive systems in lab studies and found that wage or flat-rate pay was effective in improving performance only 33% of the time when using a liberal estimate of performance change, and 0% of the time when using conservative estimates, as compared to no-pay control groups (Bonner et al., 2000). In a 2001 review of the behavioral
incentive research literature it was found that “in both laboratory and field studies, individuals have consistently performed better when they have received individual incentives than when they have been paid hourly wages” (Bucklin & Dickinson, 2001, p.53). The research literature suggests that there are better ways to pay workers than the traditional wage system.

**Piece-rate incentive systems.** In a piece-rate system performers are paid per unit of output, which ties the amount of pay earned very closely to performance, as compared to a system that is contingent on time, or reaching a certain performance level. Piece-rate pay systems can have as much as 100% of pay dependent on performance, however much more common is base-pay plus piece-rate pay. Such a system provides both security to the worker in the form of a minimum guaranteed pay (Aamodt, 2013), and performance improving effects indistinguishable from a pure piece-rate system (Dickinson & Gillette, 1993). Additionally, a base-pay plus piece-rate pay allows for more valid comparisons with a bonus pay system because it permits researchers to keep the base pay constant. Thus, the proportion of pay that is incentive-based can be held constant across pay conditions. As such, unless otherwise noted, piece-rate pay systems as discussed here will refer to a base-pay plus piece-rate pay system.

Past research indicates that piece-rate incentive systems have very powerful effects on behavior and can lead to a great increase in productivity, compared to wage pay systems. One study examined the effects of a variant of a piece-rate system in which machine shop workers were paid a percentage of dollars billed for jobs completed. Results showed an average increase in dollars billed of more than 190% compared to baseline (Gaetani, Hoxeng, & Austin, 1986). In another study, a large glass
manufacturing company implemented a piece-rate system for nearly 3,000 employees. The result was an increase in productivity of 44%, with a corresponding increase in profitability for the company, as well as an increase in quality of work and customer satisfaction. Further, the effects of the system maintained over the 19-month period of the study (Lazear, 2000). Research also suggests that as little as 3% of total wages in variable pay may be enough to produce significant performance improvements (Dickinson & Gillette, 1993; Frisch & Dickinson, 1990; LaMere, Dickinson, Henry, Henry, & Poling, 1996; Matthews & Dickinson, 2000).

Lee et al. (1997) suggested that a piece-rate system may not produce the same drop off in performance that may be expected with a bonus system, as “if the goals become either too hard or too easy, subjects are free to adjust [their personal goals] and still attain the full benefit of high effort and performance” (p. 558). As was previously discussed, goals can improve performance, however with a piece-rate system there is no additional benefit for participants to reach the next goal level. Thus, as piece-rate pay is performance-contingent, rather than goal-contingent, it is unclear whether a tiered goal system would lead to any additional performance improvements.

**Threshold piece-rate pay systems.** One way to address the potential disconnect between piece-rate pay and goal attainment is with a threshold piece-rate incentive system. This system blends piece-rate pay with a tiered bonus system, such that reaching each goal level increases the per-piece pay rate for an individual. A variant of a threshold piece-rate system was implemented for check proof operators at the Union National Bank in Little Rock, Arkansas (Abernathy, Duffy, & O’Brien, 1982; Dierks & McNally, 1987). Operators were able to earn performance-contingent pay based on the average number of
checks proofed. Employees earned a certain number of points per day based on hourly performance. Each point was worth $0.75; points were then multiplied by the number of hours worked per day to calculate the daily performance bonus. Performance below 1,700 checks per hour earned no point bonus, between 1,700 and 2,100 checks earned one point per hour; between 2,100 and 2,500 earned two points per hour; performance above 2,500 per hour earned a three point bonus. The resulting increases in productivity resulted in an average yearly savings of $700,000 over a 2.5 year period. This type of system does not fully blend in piece-rate pay, as each additional unit (checks proofed in this instance) above a goal level did not earn workers additional pay. Instead, sustained performance at or above that level was required to earn the pay multiplier throughout the day.

One lab study sought to examine the effects of an exponential piece-rate system as compared to a linear system (Oah & Dickinson, 1991). In the exponential system each piece produced earned the participant an incentive that increased by the previous amount raised to the 1.5 power, as compared to 1 (same at all performance levels) in the piece-rate group. This meant that while pay was approximately equivalent in the beginning, the exponential pay group began earning substantially higher payout with increased performance. Results indicated that there was not a significant difference in either the level of performance or the rate of performance increase. Duncan and Smoot (2001) reviewed Oah and Dickinson (1991) as well as other studies, and concluded that “the slope of the payoff curve does not have a differential effect on productivity” (pp. 263, 267). While the accelerating incentive pay system is similar to the threshold piece-rate system in that pay rate increases with performance, it is dissimilar in that each additional unit pays slightly higher than the last. In a threshold piece-rate system participants would
be paid the same rate until they reached the next goal level. After the achievement of each goal the payout per piece would increase across all units produced. Additionally, participants in the Oah and Dickinson study did not have performance goals, whereas a threshold piece-rate system would necessarily incorporate such goals.

Another study assessed participants’ behavior in a simulated investment task (Pikulina et al., 2013). In one condition participants were paid in a linear fashion, in which they always received 35% of the profits from the task. In the other condition participants were exposed to a threshold piece-rate system, in which they were paid based on total performance. If returns were below 25% then participants earned 25% of the total profit, if returns were between 25% and 45% they earned 35% of total profit, and returns above 45% earned participants 45% of total profit. The researchers also manipulated the returns possible for each trading round, such that in the high return condition the threshold piece-rate goals were relatively achievable, while in the low return condition the goals were much harder to achieve. The results showed that those in the threshold piece-rate condition made significantly poorer investment decisions and performed worse than those in the linear condition. Additionally, participants in the threshold piece-rate condition traded less frequently after they reached a given threshold. This decrease in activity was most pronounced after the highest goal level was reached. This indicates that a threshold piece-rate system may produce not only poorer performance than a linear system, but also that performance may decrease when the next goal level is out of reach, similar to what is seen in a bonus systems with unattainable goals. However, based on the limited research in this area it is unclear whether this effect is a characteristic of the threshold piece-rate payment system or due to some other variable.
**Bonus incentive systems.** Performance-based bonuses are a common type of incentive in the applied world; however, the term “bonus” typically encompasses a very wide variety of pay methods. In a survey on organizational pay practices, 80% of the 1,381 companies that responded indicated that they paid some form of variable pay (Worldatwork, 2010). However, of those, only 67% were reportedly individual incentives. Further, it is not clear what the performance standards used in such systems look like. Thus, while performance-based bonuses are reported to be widely used it is difficult to know the details of these systems.

The specific characteristics of a bonus system have been shown to affect performance in a bonus incentive system. As seen in Mowen et al. (1981) and Lee et al. (1997) performance can drop off substantially when bonus pay is contingent on reaching a single, very high goal. When participants have the opportunity to earn only a single bonus for the achievement of some very difficult or nearly impossible goal, they may give up trying to reach that goal. Such a system is often called a stretch goal system, the pros and cons of which were discussed previously. Daniels and Bailey (2014) suggest setting initial goals at a level so low workers are almost assured to reach them. While they advocate for setting a terminal goal level at a challenging yet attainable level, they also suggest setting multiple sub-goals that lead to the desired performance level to increase the number of opportunities of reinforcement.

One potential downside of such a tiered bonus system is the possibility of performance plateaus. As Mowen et al. (1981) and Lee et al. (1997) suggested, setting a goal-contingent bonus level too high is likely to have detrimental effects on performance. It may be the case that a tiered bonus system will produce such effects for each performer
when he reaches the point at which the next goal is perceived to be unattainable. While it may be the case that he may be able to produce a few additional units of output there is no benefit, and thus performance may not increase beyond the highest attainable goal.

**Summary and Rationale**

Despite the vast amount of research on both goal-setting and monetary incentive systems there are still many questions on the interaction of the two (Latham & Locke, 2013). The present study sought to investigate some of the variables involved in this relationship. Specifically, this study investigated the different effects of four pay systems, wage pay, piece-rate pay, threshold piece-rate pay, and bonus pay on performance. These payment systems were implemented in combination with a tiered goal system. As suggested by Latham and Locke (2013), a 5-tier goal system was used across all conditions.

The study included an evaluation of whether there was a difference in performance when a piece-rate system (threshold piece-rate pay) is linked to goal achievement, as compared to a piece-rate system with goals that do not affect payout, comparisons that have not yet been made to the author’s knowledge. As was suggested by past research (Lee et al., 1997; Mowen et al., 1981) there may be an interaction between goal level and goal-contingent bonuses. The present study investigated whether that effect persisted when a tiered goal system was implemented.

It was hypothesized that there would be differences between the pay systems. The research suggested that wage systems would be less effective than all other systems. Although Lee et al. (1997) reported that on average (across the low, medium, and high goal conditions) participants who were paid goal-contingent bonuses performed worse
than participants who were paid hourly, it was expected that the tiered goals would mitigate or reverse this effect because the tiered goals would function as ability-based goals (Jeffrey et al., 2012). Such a system would be likely to put individuals in contact with a greater amount of reinforcement, as compared to bonus pay in a single goal condition. No hypothesis about the relative effects of the remaining three systems was made.

To maximize the effects of the incentive systems, participants received graphic and vocal feedback on their performance, as well as job aids for calculating their performance payout. However, evaluative feedback was not used in the present study so as to isolate the effects of the pay systems from any possible extraneous sources of reinforcement for high levels of performance. Finally, a modified version of the KUT (Klein et al., 2014) was administered to participants in the study to assess levels of goal commitment between groups and across sessions, and to see whether commitment to particular goals changed across sessions for each pay system. It was hoped that the results of this study would help to shed additional light on how money can be used to affect performance.
METHOD

Participants

Sixty-six students from Western Michigan University participated in this study. Participants were recruited by in-class announcements in various undergraduate psychology classes (see Appendix A for the recruitment script). Participants who expressed interest in the study were given an assessment form (see Appendix B) to fill out that determined whether or not they met criteria to participate in the study. The form screened participants on five criteria.

First, individuals who had been a participant in a previous study using the experimental task used in the current study were excluded. Second, students who had taken PSY 3440 or PSY 4440, Organizational Psychology for psychology minors or majors, were excluded from the study. Previous exposure to the experimental task used in the present study or to the incentive research area may have influenced performance. Third, participants were excluded if at the time of the study they held or had held any sort of data processing job. Past studies have found that participants with data entry experience are significantly better at performing this task than naïve performers, and introduce extreme variability into the dataset. Fourth, participants needed to report playing computer games or using the internet for recreational purposes for at least 5 hours per week (see Appendix B). Full internet access was made available to participants during the study, as well as silent use of cell phones, in addition to six computer games on the desktop, as an analogue to off-task activities available to employees in the workplace. A recent survey of 1,034 employees reported that workers frequently engage in non-work activities using company computers or personal mobile devices (Carey & Trap, 2014).
Specifically, 68% indicated that they check personal e-mail daily, 52% indicated that they text daily, 23% indicated that they play games daily, and 21% indicated that they post to social media daily. These data support the inclusion of such off-task activities in the current study. Additionally, selecting participants who found such activities reinforcing increased the probability of seeing greater effects of the independent variables. Participants who did not find such off-task activities reinforcing might have engaged in the experimental task simply because there was nothing better to do, masking the effects of the independent variable. Finally, participants who indicated that they were available for six separate days for one hour each day were included in the study. Individuals were then asked to sign the consent form approved by the Western Michigan University Humans Subjects Institutional Review Board (see Appendix C for consent form and Appendix D for the HSIRB approval letter).

There were a total of 75 participants who met the above criteria and were recruited into the study. Of those, one withdrew due to unforeseen time conflicts, another was dropped because of experimental contamination, and seven failed to show up for all six sessions for unknown reasons. The remaining 66 participants were 50% male (n=33) and 50% female (n=33), with an average age of 20 years. Because some participants dropped out relatively late in the study there were slight differences in group size for wage pay (n = 15), piece-rate pay (n = 18), threshold piece-rate pay (n = 16), and bonus pay (n = 17). Participants reported an average of 12.65 hours per week spent using the computer and or the internet for recreational purposes. Finally, 89.39% (n=59) reported that they were employed at the time of the study, or had been employed in the past. Of
those 88.13% (n=52) reported they were paid an hourly wage, another 11.86% (n=7) reported that they were paid an hourly wage plus a bonus or commission.

All participants were paid $4.50 for attending the first session, during which their performance on the task was assessed. Participants then attended five experimental sessions. Individuals who were randomly assigned to the three incentive conditions were paid a base rate of $4.50 for each 45-minute session plus incentive pay contingent on performance. Individuals randomly assigned to the wage condition received $6.50 for their participation, which reflected the amount that an average performer was expected to receive in the incentive pay conditions. All participants were paid during the final debriefing session or after their last session if the participant was unable to complete the study.

**Setting**

Experimental sessions were conducted in a university research lab (2532 Wood Hall). Participants were seated at one of three workstations, each separated by a partition to prevent participants from distracting one another. Each workstation had a desktop computer running Windows 7, 22” display, keyboard, mouse, gel palm rest, and an adjustable chair. Cubicle walls also separated the work area from a general laboratory area. On each partition a list of the five goal levels, which were constant across all conditions, was posted. Additional rooms across the hall from the lab (Wood Hall, 2510 and 2512) were used to greet participants before each session, to provide individualized feedback, and to arrange subsequent sessions. Except when greeting participants, the experimenter remained in the general laboratory area during the experimental sessions.
Apparatus

The experimental task consisted of a medical transcription data entry task designed to simulate the job of a medical data entry clerk. The computer program provided participants with data corresponding to “patients.” Participants first identified the patient ID number and entered it into the appropriate location. They then determined whether the patient’s heart rate (HR) was within range by first determining the gender of the patient, indicated by a box labeled gender on the side of the screen. Next they compared the given HR for each record to the range for the relevant gender and clicked “within range” or “out of range” as appropriate. When participants were satisfied with their responses, they clicked the “submit” button to generate the next record. A screenshot of the experimental task is provided in Appendix E.

Each computer had six games on the desktop available for play at any time: Solitaire, Mahjong, Text Twist, Jewel Quest, Bejeweled, and Angry Birds. The first five games were selected based on survey results from three introductory psychology classes and one child psychology class at Western Michigan University in the 2010 Spring semester (N=348 students). Students were asked to pick up to five games they played most frequently from a list of the 20 most downloaded games on a popular computer game website, shockwave.com. Angry Birds was selected because it was the most downloaded paid app in iTunes in 2013. All remained among the most popular games in 2014, as indicated on windows.microsoft.com and apple.com/itunes/charts/. Job aids with instructions for each game were provided at each workstation. Additionally, each computer had full access to the Internet. Participants were allowed to access any website they pleased, however the sound on all of the computers was disabled to prevent
disruption of other participants. Finally, all participants were allowed to use their cell
phones and were allowed to listen to music, provided other participants were not
disrupted.

**Dependent Variables**

The primary dependent variable was the number of correctly completed patient
records. Other variables may have affected the primary dependent variable and thus were
measured as secondary dependent variables: (1) time on task, i.e., the average number of
minutes spent performing the experimental task in each session; (2) accuracy, i.e., the
average percentage of patient records completed correctly per session; and (3) data entry
rate, i.e., the average number of patient records completed per time on task per session.

The computer program automatically recorded the time off task, defined as pauses
in responding longer than 30 seconds, and calculated the time on task by subtracting the
cumulative number of seconds off task from the total session time. The computer
program also automatically recorded the data entry rate, and number of correct and
incorrect patient record entries. At the end of each day the experimenter copied the data
from the computer to a password protected flash drive to ensure prevention of data loss.
At the end of the study, the primary researcher calculated the average time spent on-task
per session and the average percentage of medical records completed correctly per
session. A sample spreadsheet with hypothetical participant data is provided in Appendix
F.

After an initial performance assessment, all participants were assigned the same
five quantitatively tiered performance goals. Before each work session began,
participants completed the goal commitment questionnaire on the experimental
computers using an online survey tool. The online survey allowed participants to complete the questionnaire in privacy, preventing potential bias from the presence of the experimenter, which could have occurred if the questionnaire had been administered by the experimenter. The questionnaire was based on the KUT scale of goal commitment (Klein et al., 2014). Participants’ answers with regard to commitment to the goals were compared across time and between groups. This questionnaire also asked participants to list their own personal goals for the upcoming session if applicable. Personal goals were also compared across time and between groups (see Appendix G for commitment and personal goal questionnaire questions).

**Independent Variable**

There were four experimental conditions, with the type of pay system serving as the independent variable. The four pay conditions, described in detail below, were (a) a wage payment system in which individuals received a flat rate (no bonus or incentive pay), (b) a piece-rate pay system in which the per-piece incentive was the same irrespective of the goal, (c) a threshold piece-rate system in which the amount of the per-piece incentive increased when individuals meet successively higher goals, and (d) a bonus pay system in which the bonus pay increased when individuals met successively higher goals.

Participants in each condition were given the same five goals (300, 395, 450, 490, and 525 correctly completed records). The goals were based on two data sets. First, nine research assistants were instructed to do their best when performing the medical transcription task. Second, Urschel (2014) conducted a study in which 16 participants were given three tiered goals and paid goal contingent monetary bonuses. High, medium,
and low performance was compared across the two data sets to arrive at the current high, medium, and low goals.

The other two goals (below and above the medium goal) and the intervals between the five goals were unevenly spaced so as to balance out the pay rate for the threshold piece-rate and bonus incentive conditions. While ideally, participants in all three incentive conditions (piece-rate pay, threshold piece-rate pay, and bonus pay) would receive the same payout for the same performance level, that was not possible. Because the payouts for the threshold piece-rate pay and bonus pay systems were goal-dependent, while the payouts in the piece-rate pay system were goal-independent, it was decided to equalize the payouts for the former two systems so that the amount of incentive pay earned for each goal level was the same. All three incentive systems, however, were designed so that if participants correctly completed 525 records (the highest level goal), they received the same maximum payout of $3.00 in incentive pay ($7.50 total pay). All three pay systems were capped, meaning that participants could not earn additional money if they correctly completed more than 525 records.

In addition to receiving the same goals, participants in all four pay conditions received the same type of feedback: pre-session experimenter-provided feedback in the form of a receipt and line graph, and computer-provided in-session feedback. The feedback procedures are detailed in the Procedures section.

**Wage payment.** Participants in this condition were paid a flat rate of $6.50 per session. This amount consisted of a base rate of $4.50 plus the average anticipated performance pay of $2.00 based on data from Urschel (2014).
**Piece-rate pay.** Participants were paid a base rate of $4.50 per session, plus $0.0057 per correct record, regardless of the goal level attained. This pay rate was chosen so that participants in this condition would earn the same payout as the other two incentive conditions ($3.00) for maximum performance (525 correct records). Pay was capped at 525 entries, such that performance above this level produced no additional pay.

**Threshold piece-rate pay.** Participants were paid a base rate of $4.50 plus a per-piece incentive for each correct record; however at each goal level the amount they received for each record increased (see Table 1). Like the other incentive conditions performance-based pay discontinued above 525 entries.

### Table 1

*Pay Schedule for Threshold Piece-Rate Pay System*

<table>
<thead>
<tr>
<th>Goal</th>
<th>Range</th>
<th>Amount Per Correct Record</th>
<th>Total Incentive Pay for Meeting Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>1-300 Records</td>
<td>$0.0033</td>
<td>$1.00</td>
</tr>
<tr>
<td>395</td>
<td>301-395 Records</td>
<td>$0.0038</td>
<td>$1.50</td>
</tr>
<tr>
<td>450</td>
<td>396-450 Records</td>
<td>$0.0044</td>
<td>$2.00</td>
</tr>
<tr>
<td>490</td>
<td>451-490 Records</td>
<td>$0.0051</td>
<td>$2.50</td>
</tr>
<tr>
<td>525</td>
<td>491-525 Records</td>
<td>$0.0057</td>
<td>$3.00</td>
</tr>
</tbody>
</table>

**Bonus pay.** Participants received $4.50 base pay plus $1.00 for reaching the first goal of 300 correct records. Achievement of each of the next four goal levels earned an additional $0.50 for a maximum total bonus payout of $3.00. Specifically, individuals received a $1.50 bonus for correctly completing 395 records, a $2.00 bonus for correctly completing 450 records, a $2.50 bonus for correctly completing 490 records, and $3.00 bonus for correctly completing 525 or more records. Participants could not earn any incremental bonus pay for performance above the goal, but below the next highest goal.
Experimental Design

A mixed 4 x 5 factorial design was used to test the hypothesis that the pay systems produce differential effects on performance. Factor A was a between-subjects factor with four levels: (1) wage pay, (2) piece-rate pay (3) threshold piece-rate pay, and (4) bonus pay. Factor B was a within-subjects factor, performance for sessions two through six. Performance from session one, in which participants were only told to do their best, was used as a covariate. Participants then completed five sessions in their assigned pay group.

Although a within-subject design was considered for comparing the different pay systems, it was rejected because previous research has found that exposure to one pay system can affect performance on another (Dickinson & Gillette, 1993; Pritchard, Hollenback, & DeLeo, 1980; Pritchard, Leonard, Von Bergen, & Kirk, 1976). Additionally, Komaki (2001) persuasively argued that between-group designs are more appropriate when comparing the relative effectiveness of different interventions. Finally, while it is important to assess individual performance across time, a key unit of analysis in organizational research is the performance of groups of individuals across time as well. As such, experimental research that examines group performance lends itself more readily to direct application by managers, who are often most interested in the average increase in performance.

Statistical Analysis

A 4 x 5 analysis of covariance, corrected using a Hunyh-Feldt estimation of Box’s Epsilon, was planned to determine if there were effects of incentive type and/or session on the number of correctly completed patient records. As detailed in the Results section, data from the last experimental session were excluded from analysis due to irregularities;
thus a 4x4 analysis of covariance was used to analyze the data. Prior to running the analysis of covariance test, the regression slopes were tested to ensure homogeneity. A post hoc analysis on ability was planned, however, as detailed in the Results section, this analysis was not conducted.

Pearson product moment correlations were calculated to determine the strength of the relationship between the average number of correctly completed patient records and the three secondary dependent variables: time on task, accuracy, and data entry rate. Analyses of variance were used to determine if participants in the four groups answered the commitment questionnaire items differently and if their personal goals differed between groups or over time. Analysis of variance was also used to assess whether participants in the four groups spend different amounts of time on the work task.

Procedures

Introductory session. When potential participants indicated interest in the study they were instructed to come to the experimental lab (2523 Wood Hall) where they were asked to read the consent form. The experimenter answered any questions they had and asked them to sign the consent form. Each potential participant was then asked to complete the potential participant questionnaire. Those who did not meet the inclusionary criteria outlined in the Participants section were thanked for their time and dismissed. Those who met the criteria were assigned a number, then asked to practice the task for 10 minutes and schedule the six subsequent sessions (see Appendix H for script). Upon acceptance into the study, participants were randomly assigned to one of the four pay conditions, using a list of random numbers.
**Do your best session.** Participants were instructed to do their best at the task for 45 minutes. The data from this session were used as a covariate for pre-existing ability on the task. Participants were paid $4.50 for this session.

**Experimental sessions.** The experimental phase consisted of five 60-minute sessions, with the first 15 minutes of each devoted to individualized feedback and completion of the goal commitment questionnaire, and 45 minutes devoted to the work task. Before the participants began their first experimental session the experimenter explained the relevant pay system for their remaining five sessions (see Appendix H for the instructional script). Once the experimenter explained the pay system, participants were given a short quiz to assess the extent to which they understood the pay system. Participants who did not pass the quiz were retrained on the relevant items and given another quiz. This process continued until the participant was able to complete the quiz with 100% accuracy (see Appendix I for pay quiz). Participants were then brought into the lab to complete the goal-commitment and personal goal questionnaire and begin the experimental task.

At the beginning of each subsequent experimental session participants were greeted by the researcher and escorted to a private room across from the experimental lab. Participants were given a printed receipt that displayed the number of correctly completed patient records, their base pay, and, if applicable, the incentive pay earned in the previous session. For the piece-rate and threshold piece-rate pay conditions, payout amounts were automatically calculated when the number of correct records was entered in an Excel document, which was printed out before the session and given to participants. Experimenters filled in the feedback sheets by hand for the wage pay and bonus pay
conditions because these calculations were much simpler than the other two conditions. Below the written feedback on the number of correctly completed records, the goal levels were listed, and, for the incentive groups, the relevant payout at each level (see Appendices J, K, L, M, N, O, P, & Q for sample receipts). Participants also received a printed graph of their past performance that displayed the five goals as well as the pay associated with each level, if applicable (see Appendices R, S, T, & U for graphs).

While experimenters provided informational vocal feedback they did not provide any evaluative feedback, such as praise or criticism. As stated before, it may seem unusual to deliver feedback on performance without making some evaluative statement, such feedback has been shown to influence performance (D. A. Johnson, 2013) and thus could have confounded the effects of the pay systems. After the experimenter explained the participant’s performance and pay, he or she was brought to the experimental lab, completed the goal commitment and personal goal questionnaire, and then began the task.

The data entry program provided in-session feedback that could be hidden or displayed by the participants by clicking a button on screen. A feedback window was displayed and remained on screen until the participants clicked the button again to hide it. The feedback window displayed (a) the total number of records completed at that point in the session, (b) the number of correctly completed records at that point in the session, and (c) the rate of record completion (number of records completed per minute on task) at that point in the session. The number of records completed and the number correctly completed refreshed after each record. The rate of record completion refreshed every 30 seconds. The program automatically ended after 45 minutes passed and provided feedback on the number of records completed both correctly and in total.
Debriefing. At the end of the sixth session, the experimenter escorted the participant back into the private room and scheduled a time for the final debrief session. At this session the experimenter delivered the final feedback receipt, and asked the participant to complete the Stress/Satisfaction questionnaire in order to compare responses across pay groups (see Appendix V for questionnaire). Next, the experimenter paid the participant the money earned during the study, described the purpose of the study, potential applications to the workplace, answered any questions, and thanked the participant for his or her participation (see Appendix W for debriefing script).

Integrity of the Independent Variable

All interactions with participants were scripted and research assistants were extensively trained to conduct sessions and record the data before the study began. Immediately after each session, the feedback and pay receipts were prepared for the participants’ next session. Payout values for the piece-rate and threshold piece-rate systems were computed using an Excel spreadsheet to minimize the chances for error and ensure accuracy. As the computation of pay in the wage and bonus conditions was minimal, these were done by hand. Additionally, at the end of each day all recorded values and pay receipts were cross checked against the computer record of correctly completed records by two experimenters working in concert. Any errors in calculation were corrected before any feedback was delivered to participants.
RESULTS

Primary Analysis

The primary dependent variable was the number of correctly completed records on the medical data entry task. Table 2 displays the raw means and standard deviations of all four groups for the one covariate and five experimental sessions. Before conducting the primary analysis of covariance (ANCOVA) on the effects of pay system on performance, a test of the homogeneity of the regression slopes of the four groups was conducted. Results showed that the effect of the independent variable was homogenous across all levels of the covariate for all groups. This allowed for an ANCOVA test on performance during the experimental sessions, using session 1 “do your best” performance as the covariate. Table 3 and Figure 1 display the adjusted means for each experimental session and for each group, and Table 4 displays the ANCOVA source table.

A 4 (pay group) x 5 (experimental session) ANCOVA corrected using the Hunyh-Feldt estimation of Box’s epsilon was planned to assess the differences between pay groups and across time; however for this analysis and all ensuing analyses performance during the final experimental session, session six, was excluded. This was done because average performance increased substantially for the wage pay group during this session, as can be seen in Tables 2 and 3. Several comments during the exit interviews suggested that the impending end of the study may have functioned as a reflexive conditioned establishing operation for participants, increasing both the reinforcing effectiveness of goal attainment and the probability of behavior that resulted in goal attainment. It was determined that session six performance was not representative of the effects of the pay system, thus, a 4x4 ANCOVA was conducted.
Table 2

*Raw Means and Standard Deviations for Correctly Completed Records*

<table>
<thead>
<tr>
<th>Session</th>
<th>Pay group</th>
<th>Wage Mean</th>
<th>Wage SD</th>
<th>Piece-rate Mean</th>
<th>Piece-rate SD</th>
<th>Threshold piece-rate Mean</th>
<th>Threshold piece-rate SD</th>
<th>Bonus Mean</th>
<th>Bonus SD</th>
<th>Overall Mean</th>
<th>Overall SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. “Do your Best”</td>
<td></td>
<td>186.87</td>
<td>84.73</td>
<td>228.11</td>
<td>85.73</td>
<td>207.75</td>
<td>60.14</td>
<td>212.47</td>
<td>64.64</td>
<td>208.80</td>
<td>73.81</td>
</tr>
<tr>
<td>2. Experimental</td>
<td></td>
<td>253.80</td>
<td>90.35</td>
<td>302.22</td>
<td>91.93</td>
<td>289.00</td>
<td>76.05</td>
<td>295.18</td>
<td>69.93</td>
<td>285.05</td>
<td>82.07</td>
</tr>
<tr>
<td>3. Experimental</td>
<td></td>
<td>252.40</td>
<td>113.84</td>
<td>327.28</td>
<td>98.66</td>
<td>291.63</td>
<td>96.33</td>
<td>330.59</td>
<td>92.89</td>
<td>300.47</td>
<td>100.43</td>
</tr>
<tr>
<td>4. Experimental</td>
<td></td>
<td>254.73</td>
<td>107.77</td>
<td>336.72</td>
<td>100.86</td>
<td>299.19</td>
<td>127.95</td>
<td>327.29</td>
<td>106.83</td>
<td>304.48</td>
<td>110.85</td>
</tr>
<tr>
<td>5. Experimental</td>
<td></td>
<td>257.53</td>
<td>118.97</td>
<td>354.83</td>
<td>100.51</td>
<td>311.75</td>
<td>139.89</td>
<td>323.53</td>
<td>139.97</td>
<td>311.91</td>
<td>124.84</td>
</tr>
<tr>
<td>6. Experimental</td>
<td></td>
<td>305.60</td>
<td>133.59</td>
<td>352.89</td>
<td>94.05</td>
<td>321.25</td>
<td>140.97</td>
<td>326.29</td>
<td>148.84</td>
<td>326.51</td>
<td>129.36</td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td>251.82</td>
<td>108.2</td>
<td>317.01</td>
<td>95.29</td>
<td>286.76</td>
<td>106.89</td>
<td>302.56</td>
<td>103.85</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3

*Adjusted Means for Correctly Completed Records*

<table>
<thead>
<tr>
<th>Session</th>
<th>Pay group</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Wage</td>
<td>Piece-rate</td>
<td>Threshold</td>
<td>Bonus</td>
<td>Overall</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>piece-rate</td>
<td>piece-rate</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>2. Experimental</td>
<td>273.60</td>
<td>286.37</td>
<td>290.75</td>
<td>292.84</td>
<td>285.89</td>
<td></td>
</tr>
<tr>
<td>3. Experimental</td>
<td>270.25</td>
<td>312.99</td>
<td>293.20</td>
<td>328.49</td>
<td>301.23</td>
<td></td>
</tr>
<tr>
<td>4. Experimental</td>
<td>269.74</td>
<td>324.71</td>
<td>300.51</td>
<td>325.53</td>
<td>305.12</td>
<td></td>
</tr>
<tr>
<td>5. Experimental</td>
<td>274.52</td>
<td>341.23</td>
<td>313.25</td>
<td>321.53</td>
<td>312.63</td>
<td></td>
</tr>
<tr>
<td>6. Experimental</td>
<td>326.25</td>
<td>336.35</td>
<td>323.07</td>
<td>323.86</td>
<td>327.38</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>282.87</td>
<td>320.33</td>
<td>304.16</td>
<td>318.45</td>
<td>318.45</td>
<td></td>
</tr>
</tbody>
</table>

*Figure 1.* Adjusted scores for average number of correctly completed records per session.
The ANCOVA revealed no significant effect of pay group on performance, $F(3, 61) = 1.11, p = .35$. Additionally, the Huynh-Feldt corrected values for each session revealed no significant changes in performance across experimental sessions, $F(2.46, 160.52) = 2.05, p = .12$.

A repeated measures analysis of variance (ANOVA) was conducted to assess the effects of the pay system plus feedback and tiered goals on performance. Performance in the “do your best” covariate session was compared to average performance in the experimental sessions for each group individually. For all four pay groups, there was a significant difference between the covariate session and average performance during the experimental sessions, indicating that the introduction of each of the four pay systems, plus tiered goals and feedback significantly increased performance compared to “do your best” goals and computer generated feedback. Table 5 displays the means, standard deviations, and effect size tests for this analysis; Tables 6, 7, 8, and 9 display the ANOVA source tables for each group. Effect size estimates, calculated using Cohen’s $d$ statistic, showed that the introduction of the intervention variables produced a very large effect on performance for all four groups (Cohen, 1988).

---

**Table 4**

*ANCOVA Source Table for Correctly Completed Records*

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>$F$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time variable (A)</td>
<td>3</td>
<td>16341</td>
<td>5447</td>
<td>2.05</td>
<td>.11</td>
</tr>
<tr>
<td>Error (A)</td>
<td>183</td>
<td>486039</td>
<td>2656</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pay Group (B)</td>
<td>3</td>
<td>20446</td>
<td>6815</td>
<td>1.11</td>
<td>.35</td>
</tr>
<tr>
<td>A x B</td>
<td>9</td>
<td>19473</td>
<td>2164</td>
<td>.82</td>
<td>.60</td>
</tr>
<tr>
<td>Error (B)</td>
<td>61</td>
<td>373198</td>
<td>6118</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>259</td>
<td>915497</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

The ANCOVA revealed no significant effect of pay group on performance, $F(3, 61) = 1.11, p = .35$. Additionally, the Huynh-Feldt corrected values for each session revealed no significant changes in performance across experimental sessions, $F(2.46, 160.52) = 2.05, p = .12$.

A repeated measures analysis of variance (ANOVA) was conducted to assess the effects of the pay system plus feedback and tiered goals on performance. Performance in the “do your best” covariate session was compared to average performance in the experimental sessions for each group individually. For all four pay groups, there was a significant difference between the covariate session and average performance during the experimental sessions, indicating that the introduction of each of the four pay systems, plus tiered goals and feedback significantly increased performance compared to “do your best” goals and computer generated feedback. Table 5 displays the means, standard deviations, and effect size tests for this analysis; Tables 6, 7, 8, and 9 display the ANOVA source tables for each group. Effect size estimates, calculated using Cohen’s $d$ statistic, showed that the introduction of the intervention variables produced a very large effect on performance for all four groups (Cohen, 1988).
Table 5

ANOVA and Effect Sizes for Average Experimental Effect

<table>
<thead>
<tr>
<th>Pay Group</th>
<th>“Do your best” session</th>
<th>Dependent variable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Wage</td>
<td>186.87</td>
<td>84.73</td>
</tr>
<tr>
<td>Piece-rate</td>
<td>228.11</td>
<td>85.73</td>
</tr>
<tr>
<td>Threshold piece-rate</td>
<td>207.75</td>
<td>60.14</td>
</tr>
<tr>
<td>Bonus</td>
<td>212.47</td>
<td>64.64</td>
</tr>
</tbody>
</table>

Table 6

Wage Pay ANOVA Source Table for Correctly Completed Records

<table>
<thead>
<tr>
<th>Source</th>
<th>$df$</th>
<th>SS</th>
<th>MS</th>
<th>$F$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment Session</td>
<td>1</td>
<td>34425</td>
<td>34425</td>
<td>9.84</td>
<td>.01</td>
</tr>
<tr>
<td>Participant</td>
<td>14</td>
<td>159338</td>
<td>11381</td>
<td>3.25</td>
<td>.02</td>
</tr>
<tr>
<td>Error</td>
<td>14</td>
<td>48969</td>
<td>3498</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>242733</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7

Piece-Rate Pay ANOVA Source Table for Correctly Completed Records

<table>
<thead>
<tr>
<th>Source</th>
<th>$df$</th>
<th>SS</th>
<th>MS</th>
<th>$F$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment Session</td>
<td>1</td>
<td>93917</td>
<td>93917</td>
<td>84.95</td>
<td>.00</td>
</tr>
<tr>
<td>Participant</td>
<td>17</td>
<td>258128</td>
<td>15184</td>
<td>13.73</td>
<td>.00</td>
</tr>
<tr>
<td>Error</td>
<td>17</td>
<td>18794</td>
<td>1106</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>370839</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 8

Threshold Piece-Rate Pay ANOVA Source Table for Correctly Completed Records

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment Session</td>
<td>1</td>
<td>65003</td>
<td>65003</td>
<td>17.92</td>
<td>.00</td>
</tr>
<tr>
<td>Participant</td>
<td>15</td>
<td>160622</td>
<td>10708</td>
<td>2.95</td>
<td>.02</td>
</tr>
<tr>
<td>Error</td>
<td>15</td>
<td>54417</td>
<td>3628</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>280042</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 9

Bonus Pay ANOVA Source Table for Correctly Completed Records

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment Session</td>
<td>1</td>
<td>96729</td>
<td>96729</td>
<td>20.81</td>
<td>.00</td>
</tr>
<tr>
<td>Participant</td>
<td>16</td>
<td>145347</td>
<td>9084</td>
<td>1.95</td>
<td>.10</td>
</tr>
<tr>
<td>Error</td>
<td>16</td>
<td>74386</td>
<td>4649</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>316463</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A 3x4x5 ANOVA was planned to assess whether the intervention differentially affected high, medium, or low performers across sessions. However, this test was not conducted because the regression slopes for all four pay groups were found to be homogenous when the covariate (a proxy for ability level) was regressed on average performance. Because the test for homogeneity of regression slopes indicates the extent to which the treatment effect was the same at various levels of the covariate, an additional analysis of ability level was deemed redundant.

Table 10 displays the average pay and cost per record, averaged across the four experimental sessions by group. Participants in the wage pay group earned the most money while those in the bonus pay group earned the least. Similarly, the cost per record was highest for the wage pay group and lowest for the bonus pay group, with the average cost differing by nine tenths of a cent.
Table 10

*Average Pay and Cost per Record*

<table>
<thead>
<tr>
<th>Pay group</th>
<th>Average cost per session</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Wage</td>
<td>$6.50</td>
<td>$.00</td>
<td>$.026</td>
</tr>
<tr>
<td>Piece-rate</td>
<td>$6.36</td>
<td>$.54</td>
<td>$.019</td>
</tr>
<tr>
<td>Threshold piece-rate</td>
<td>$5.66</td>
<td>$.55</td>
<td>$.019</td>
</tr>
<tr>
<td>Bonus</td>
<td>$5.33</td>
<td>$.82</td>
<td>$.017</td>
</tr>
</tbody>
</table>

**Secondary Analyses**

The number of correctly completed patient records could have been affected by three variables: (1) time on-task, i.e., the average number of minutes spent performing the experimental task in each session, (2) accuracy, i.e., the average percentage of patient records completed correctly per session, and (3) data entry rate, i.e., the average number of patient records completed divided by time on task. Table 11 displays the means and standard deviations for these variables for all four experimental groups. Table 12 displays the Pearson product-moment correlations between the number of correctly completed patient records and the three secondary variables, and among the secondary variables. Because of the large difference between time on task in wage pay and the incentive pay groups a 4x5 ANOVA was conducted. Table 13 displays the mean time on task for each session, and Table 14 displays the ANOVA source table.

While there was a significant decrease in time on task across sessions, $F(4, 248) = 3.74, p < .01$, there was no difference between any of the four groups ($p > .05$). Figure 2 shows the average time on task by experimental session and across sessions.
Table 11

Means and Standard Deviations for Secondary Dependent Variables by Group

<table>
<thead>
<tr>
<th>Pay group</th>
<th>Mean (minutes)</th>
<th>SD</th>
<th>Mean</th>
<th>SD</th>
<th>Mean (records/min)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wage</td>
<td>38.57</td>
<td>8.98</td>
<td>95%</td>
<td>5%</td>
<td>6.60</td>
<td>1.55</td>
</tr>
<tr>
<td>Piece-rate</td>
<td>43.42</td>
<td>2.44</td>
<td>97%</td>
<td>2%</td>
<td>7.39</td>
<td>1.86</td>
</tr>
<tr>
<td>Threshold piece-rate</td>
<td>40.59</td>
<td>7.43</td>
<td>97%</td>
<td>2%</td>
<td>6.79</td>
<td>1.83</td>
</tr>
<tr>
<td>Bonus</td>
<td>42.05</td>
<td>4.52</td>
<td>97%</td>
<td>2%</td>
<td>7.21</td>
<td>1.84</td>
</tr>
</tbody>
</table>

Table 12

Correlations between Primary Dependent Variable and Secondary Dependent Variables, Time on Task, Accuracy, and Rate

<table>
<thead>
<tr>
<th></th>
<th>Time on task</th>
<th>Accuracy</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correctly completed patient records</td>
<td>.67**</td>
<td>.37*</td>
<td>.96**</td>
</tr>
<tr>
<td>Time on task</td>
<td>.04</td>
<td>.47**</td>
<td></td>
</tr>
<tr>
<td>Accuracy</td>
<td></td>
<td>.34*</td>
<td></td>
</tr>
</tbody>
</table>

*p < 0.01
**p < 0.001

Table 13

Mean Time on Task by Group

<table>
<thead>
<tr>
<th>Session</th>
<th>Wage Mean</th>
<th>Piece-rate Mean</th>
<th>Threshold piece-rate Mean</th>
<th>Bonus Mean</th>
<th>Overall Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. “Do your Best”</td>
<td>38.82</td>
<td>42.11</td>
<td>41.97</td>
<td>42.03</td>
<td>41.23</td>
</tr>
<tr>
<td>2. Experimental</td>
<td>41.00</td>
<td>43.74</td>
<td>44.00</td>
<td>44.35</td>
<td>43.27</td>
</tr>
<tr>
<td>3. Experimental</td>
<td>38.40</td>
<td>43.68</td>
<td>41.43</td>
<td>43.70</td>
<td>41.80</td>
</tr>
<tr>
<td>4. Experimental</td>
<td>38.53</td>
<td>43.47</td>
<td>38.99</td>
<td>43.06</td>
<td>41.01</td>
</tr>
<tr>
<td>5. Experimental</td>
<td>35.77</td>
<td>43.61</td>
<td>38.63</td>
<td>39.88</td>
<td>39.47</td>
</tr>
<tr>
<td>Overall</td>
<td>38.50</td>
<td>43.32</td>
<td>41.00</td>
<td>42.60</td>
<td></td>
</tr>
</tbody>
</table>
Table 14

ANOVA Source Table for Average Time on Task

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time variable (A)</td>
<td>4</td>
<td>29752</td>
<td>7438</td>
<td>3.74</td>
<td>.01</td>
</tr>
<tr>
<td>Error (A)</td>
<td>248</td>
<td>493753</td>
<td>1991</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pay Group (B)</td>
<td>3</td>
<td>13156</td>
<td>21927</td>
<td>2.14</td>
<td>.11</td>
</tr>
<tr>
<td>A x B</td>
<td>12</td>
<td>17794</td>
<td>1483</td>
<td>.75</td>
<td>.71</td>
</tr>
<tr>
<td>Error (B)</td>
<td>62</td>
<td>636766</td>
<td>10270</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>329</td>
<td>1191221</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This figure suggests that after an initial increase in time on task during the first experimental session, participants in all but the piece-rate pay group spent successively less time engaging in the task. However, the variability in time on task make concrete statements about the differences between groups difficult to make.

Figure 2. Average time on task for each group.
**Goal commitment.** Goal commitment was measured using a modified version of the KUT scale (Klein et al., 2014). Participants were asked the same four questions related to goal commitment for each of the five goal levels before every experimental session. Responses on this questionnaire were then averaged to produce one overall goal commitment score per participant per experimental session.

A 4 (pay group) x 4 (session) analysis of variance showed no significant difference in goal commitment between any of the four pay groups. There was a significant effect of time on goal commitment for all pay groups, $F(3, 180) = 12.84, p < .01$. Individual pairwise comparisons revealed that there was a decrease in goal commitment between the first experimental session and the remaining experimental sessions for all pay groups, but no differences in goal commitment between the remaining three sessions. Table 15 shows the average KUT score for each pay group, as well as the standard deviation and correlation between responses on the KUT questionnaire and performance. Table 16 shows the KUT scores across all four sessions and Table 17 shows the ANOVA source table. There was a significant overall correlation between reported goal commitment and performance, $r(256) = 0.44, p < .01$. An additional analysis between the lowest obtained correlation, piece-rate pay, and the other three pay groups showed that there were no significant differences in correlations compared to wage pay ($Z = .84, p = .40$), threshold piece-rate pay ($Z = .46, p = .65$) or bonus pay ($Z = .58, p = .56$).
Table 15

*KUT Score: Means, Standard Deviations, and Correlations between KUT Score and Performance*

<table>
<thead>
<tr>
<th>Pay group</th>
<th>Mean</th>
<th>SD</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wage</td>
<td>2.95</td>
<td>1.12</td>
<td>.53**</td>
</tr>
<tr>
<td>Piece-rate</td>
<td>3.73</td>
<td>.73</td>
<td>.26*</td>
</tr>
<tr>
<td>Threshold piece-rate</td>
<td>2.93</td>
<td>1.00</td>
<td>.41**</td>
</tr>
<tr>
<td>Bonus</td>
<td>3.09</td>
<td>.95</td>
<td>.45**</td>
</tr>
</tbody>
</table>

*Note.* Data from two participants (219, 416) were excluded from the commitment analyses because of incomplete data due to experimental error.

* p < .05
** p < .001

Table 16

*Mean KUT Score by Group*

<table>
<thead>
<tr>
<th>Pay group</th>
<th>Session</th>
<th>Wage Mean</th>
<th>Piece-rate Mean</th>
<th>Threshold piece-rate Mean</th>
<th>Bonus Mean</th>
<th>Overall Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. Experimental</td>
<td>3.22</td>
<td>3.84</td>
<td>3.38</td>
<td>3.32</td>
<td>3.45</td>
</tr>
<tr>
<td></td>
<td>3. Experimental</td>
<td>3.04</td>
<td>3.68</td>
<td>2.83</td>
<td>3.00</td>
<td>3.15</td>
</tr>
<tr>
<td></td>
<td>4. Experimental</td>
<td>2.90</td>
<td>3.73</td>
<td>2.76</td>
<td>3.11</td>
<td>3.14</td>
</tr>
<tr>
<td></td>
<td>5. Experimental</td>
<td>2.68</td>
<td>3.67</td>
<td>2.75</td>
<td>2.94</td>
<td>3.03</td>
</tr>
<tr>
<td></td>
<td>Overall</td>
<td>2.95</td>
<td>3.73</td>
<td>2.93</td>
<td>3.09</td>
<td>3.09</td>
</tr>
</tbody>
</table>

**Personal goals.** All 66 participants had the opportunity to set personal goals before each of the five experimental sessions, but as before, only the first four experimental sessions were included in the analysis. Of the total 264 opportunities, goals were set 81.6% of the time (209 total personal goals set). Table 18 shows the average
personal goal, standard deviation, and correlation between personal goal and performance by pay group.

Table 17

ANOVA Source Table for KUT Score

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time variable (A)</td>
<td>3</td>
<td>6.46</td>
<td>2.15</td>
<td>12.84</td>
<td>.00</td>
</tr>
<tr>
<td>Error (A)</td>
<td>180</td>
<td>30.17</td>
<td>.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pay Group (B)</td>
<td>3</td>
<td>28.04</td>
<td>9.35</td>
<td>2.92</td>
<td>.13</td>
</tr>
<tr>
<td>A x B</td>
<td>9</td>
<td>2.10</td>
<td>.23</td>
<td>1.39</td>
<td>.20</td>
</tr>
<tr>
<td>Error (B)</td>
<td>60</td>
<td>192.25</td>
<td>3.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>255</td>
<td>259.02</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Individuals in all incentive pay groups set significantly higher goals than those in the wage pay group, $F(3, 204) = 5.519, p < .01$, however there were no significant differences between the personal goals set by individuals in any of the three incentive pay groups ($p > .05$). Table 19 displays the ANOVA source table for personal goals.

Table 18

Personal Goals: Means, Standard Deviations, and Correlations between Personal Goals and Performance

<table>
<thead>
<tr>
<th>Pay group</th>
<th>Mean</th>
<th>SD</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wage</td>
<td>311.44</td>
<td>81.10</td>
<td>.19</td>
</tr>
<tr>
<td>Piece-rate</td>
<td>370.38</td>
<td>93.20</td>
<td>.75**</td>
</tr>
<tr>
<td>Threshold piece-rate</td>
<td>371.88</td>
<td>76.08</td>
<td>.21</td>
</tr>
<tr>
<td>Bonus</td>
<td>365.95</td>
<td>73.46</td>
<td>.70**</td>
</tr>
</tbody>
</table>

** $p < .001$
Table 19

ANOVA Source Table for Personal Goals

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pay Group</td>
<td>3</td>
<td>111875</td>
<td>37292</td>
<td>5.52</td>
<td>.00</td>
</tr>
<tr>
<td>Error</td>
<td>204</td>
<td>1378383</td>
<td>6757</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>207</td>
<td>1490258</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There was a significant overall correlation between personal goals and performance $r(209) = .57$, ($p < .001$). Individual correlations showed that while personal goals were significantly correlated with performance for the piece-rate pay and bonus pay groups, there was no such correlation for the wage pay and threshold piece-rate pay groups. An additional chi-square analyses showed that there was a no significant difference between the correlations obtained in the four groups $X^2 (3, N=66) = 7.02$, $p > .05$.

**Stress and satisfaction.** A one-way ANOVA revealed no significant differences in stress ($p = 0.55$) or satisfaction ($p = 0.15$) between any of the four pay groups. Table 20 displays the average stress and satisfaction rating as well as the standard deviation for each of the four pay groups, and Table 21 and 22 display the ANOVA source tables for stress and satisfaction respectively.
Means and Standard Deviations for Responses on Stress/Satisfaction Questionnaire

<table>
<thead>
<tr>
<th>Pay group</th>
<th>Mean</th>
<th>SD</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wage</td>
<td>4.71</td>
<td>.61</td>
<td>4.77</td>
<td>.43</td>
</tr>
<tr>
<td>Piece-rate</td>
<td>4.39</td>
<td>1.20</td>
<td>4.56</td>
<td>.78</td>
</tr>
<tr>
<td>Threshold piece-rate</td>
<td>4.31</td>
<td>.79</td>
<td>4.12</td>
<td>.83</td>
</tr>
<tr>
<td>Bonus</td>
<td>4.29</td>
<td>.77</td>
<td>4.35</td>
<td>.79</td>
</tr>
</tbody>
</table>

Table 21

ANOVA Source Table for Stress

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pay Group</td>
<td>3</td>
<td>1.68</td>
<td>.56</td>
<td>.71</td>
<td>.55</td>
</tr>
<tr>
<td>Error</td>
<td>61</td>
<td>48.10</td>
<td>.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>64</td>
<td>49.79</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 22

ANOVA Source Table for Satisfaction

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pay Group</td>
<td>3</td>
<td>3.03</td>
<td>1.01</td>
<td>1.86</td>
<td>.15</td>
</tr>
<tr>
<td>Error</td>
<td>61</td>
<td>33.12</td>
<td>.54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>64</td>
<td>36.15</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DISCUSSION

Results of the primary analysis indicate that there were no significant differences in dependent variable scores between any of the three incentive pay groups, nor were there any differences between the incentive pay groups and wage pay group. While it is of interest to find that there were no significant differences between the three incentive pay groups, it is of greater interest to find that those who were paid monetary incentives did not perform significantly better than those who were paid a flat wage. These results are surprising because of the large body of literature that shows that in both lab and field studies, performance contingent monetary incentives produce statistically and practically significant increases in performance compared to wage pay (Bonner et al., 2000; Bucklin & Dickinson, 2001; Garbers & Konradt, 2014; Jenkins et al., 1998; Stajkovic & Luthans, 2003). Given the consistency of these findings, it can be concluded that there was either a serious methodological flaw in the study, or that other variables may have affected performance to a greater extent than anticipated. Potential methodological flaws will be discussed in the limitations section.

Other Intervention Variables

In addition to pay, the other intervention variables, which included feedback and goals, may have affected performance. Participants were given objective computer generated feedback, graphic feedback, and vocal feedback, as well as the same 5-tiered goals, and were reminded of those goals before each experimental session. Results showed that the introduction of pay plus the additional variables mentioned above produced significant increases in performance, with large effect sizes, compared to the “do your best” first session for all pay groups (see Table 5). While this may be due to
practice effects, after the initial increase in performance in session two there was no significant change in performance during the remaining experimental sessions. It is unlikely that participants reached maximum proficiency in the experimental task after only two sessions. This indicates that one or more of the other intervention variables may have produced these performance differences.

**Feedback.** While feedback has been shown to be an effective means of improving performance (Alvero et al., 2001; Balcazar et al., 1985), it is unlikely the feedback in the present study would have produced significant enough gains to overshadow the effects of the incentive systems. Many of the past studies that have examined monetary incentive systems included some form of feedback in both the experimental and control condition and still produced significant differences in performance (Dierks & McNally, 1987; Frisch & Dickinson, 1990; Gaetani et al., 1986; Lazear, 2000; Oah & Lee, 2011; Riedel et al., 1988; Smoot & Duncan, 1997). This indicates that incentive pay has an additive effect when paired with feedback in various forms, in comparison to wage pay, and would not have produced the effects seen in the present study.

**Goals.** Research has shown that challenging, yet attainable goals can have significant impacts on performance (Locke & Latham, 2013a), and the 5-tiered goal system in the present study may have created such goals for most performers. While some research has shown that goals plus incentives have a greater impact on performance than goals alone (e.g., Pritchard & Curts, 1973), it is possible that the 5-tiered goal system in the present study may have exerted enough control over behavior to mitigate the effects of incentive pay on performance. Mowen et al. (1981) originally found an interaction between goal difficulty and type of incentive system. Those in a bonus pay
group significantly outperformed those in a piece-rate pay group with low and medium
goals, but those in the piece-rate pay group outperformed the bonus pay group with very
difficult goals. Lee et al. (1997) replicated this interaction effect and found that
performance with goal-contingent bonus pay was significantly poorer with both low and
high assigned goals compared to piece-rate pay and wage pay. Further, while the specific
test was not conducted, performance in the piece-rate and hourly pay groups were not
appreciably different across all goal levels (and a visual analysis suggests that
performance in the hourly pay group may have been higher than that of the piece-rate pay
group). These findings suggest that goals may substantially influence performance even
in the presence of performance contingent monetary incentives.

Yet, while performance in the present study did not differ significantly between
the pay groups, there were differences in the variability of performance. Table 23 displays
the standard deviation for the first and last experimental sessions, as well as the
percentage change in standard deviation between those sessions. Piece-rate pay produced
the most stable performance across time, with an increase in variability of 9.4%, while
wage pay performance variability increased 32%. The two goal-contingent pay groups
produced much less stable performance, with standard deviations increasing 100% and
84% for threshold piece-rate pay and bonus pay respectively. This indicates that average
performance in the piece-rate pay group was much more consistent than the goal-
contingent pay groups.
Table 23

*Changes in Standard Deviations of Performance between First and Last Experimental Sessions*

<table>
<thead>
<tr>
<th>Pay group</th>
<th>Session 2 SD</th>
<th>Session 5 SD&lt;sup&gt;a&lt;/sup&gt;</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wage</td>
<td>90.35</td>
<td>118.97</td>
<td>32%</td>
</tr>
<tr>
<td>Piece-rate</td>
<td>91.93</td>
<td>100.51</td>
<td>9.4%</td>
</tr>
<tr>
<td>Threshold piece-rate</td>
<td>76.05</td>
<td>139.89</td>
<td>100%</td>
</tr>
<tr>
<td>Bonus</td>
<td>69.93</td>
<td>139.97</td>
<td>84%</td>
</tr>
</tbody>
</table>

<sup>a</sup> Sixth experimental session was excluded because of changes in performance attributable to factors other than experimental variables. Sessions 2 and 5 represent the first and last experimental sessions respectively.

This change in variability may in large part be attributable to the number of performers in the wage, threshold piece-rate, and bonus groups whose performance dropped off substantially in later sessions. In these groups performance was more likely to be maintained by goal attainment than the piece-rate group, and it may have been the case that the goals in the present study were set at too high a level. The results of Mowen et al. (1981) and Lee et al. (1997), as well as Jeffrey et al. (2012), suggest that performance decrements may occur when goals are set too high, and in the present study, most all performers had goals that were beyond their reach. This may have created a situation where participants either decreased or stopped responding when the highest attainable goal was reached, or when they were unable to reach any goal at all. Table 24 shows that the proportions of participants who actually attained the various goal levels were much lower than the expected probabilities. This indicates that many of the goals were unattainable by most participants and may have functioned as stretch goals, potentially creating adverse effects on performance.
Table 24

*Expected and Actual Proportion of Individuals to Attain each Goal Level*

<table>
<thead>
<tr>
<th>Goal</th>
<th>Expected</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>.9</td>
<td>.74</td>
</tr>
<tr>
<td>395</td>
<td>—&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.36</td>
</tr>
<tr>
<td>450</td>
<td>.5</td>
<td>.18</td>
</tr>
<tr>
<td>490</td>
<td>—&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.08</td>
</tr>
<tr>
<td>525</td>
<td>.1</td>
<td>.06</td>
</tr>
</tbody>
</table>

<sup>a</sup> Expected probability values were not calculated for the 2<sup>nd</sup> and 4<sup>th</sup> goal levels because they were set based on the payout system rather than past data.

**Behavioral Functions**

While the monetary incentives in the present study may have functioned as a reward for many performers, they were not powerful enough to produce performance differences between the incentive pay and wage pay groups. Goals on the other hand may well have served any number of behavioral functions including motivating operations, conditioned reinforcement, discriminative stimuli, or their rule-governed alternatives. The goals may have functioned as both a conditioned establishing operation of the transitive type (CEO-T), increasing the reinforcing effectiveness of feedback associated with goal attainment or progress toward goal attainment, and as a conditioned establishing operation of the reflexive type (CEO-R), increasing the aversive effects of feedback about performance below goal level (Michael, 1993). If the goals were functioning as either type of CEO, they would also have evoked behavior that led to feedback associated with progress toward the goal or goal attainment (CEO-T) or termination of feedback associated with below-goal performance (CEO-R). The effectiveness of goals as either a CEO-T or CEO-R would vary greatly depending on past reinforcement history with
regards to goal attainment. As indicated in Table 23 there was a great deal of variability in performance, particularly in those groups where goal attainment was more salient (threshold piece-rate pay and bonus pay groups), possibly indicating varying effects of goal attainment as a reinforcer.

Anecdotal data do suggest that goal attainment was a valued consequence for many participants. At the end of the session, some participants became quite excited when a new goal was attained or downhearted when a goal was narrowly missed. When asked during the exit interview why they were performing at such a high rate, a large number of participants across all groups reported that reaching the next goal level was more strongly maintaining their behavior than the extra money they would earn. Further, many reported that attaining the next highest goal level was more interesting and more rewarding than any of the alternative activities available, which included full use of the Internet and personal cell phones (however, the time on task data suggest this may have become less true over time). This indicates that goal attainment likely functioned as a reinforcer for many participants. The goals may also have functioned as direct or indirect acting discriminative stimuli for monetary incentives in the goal-contingent incentive groups and as discriminative stimuli for goal attainment in all pay groups. It should be noted that goals may have been direct acting discriminative stimuli because they were posted at the work stations and thus could have evoked keyboarding immediately. It is likely that the goals may, in fact, have served all of the above behavioral functions.

Other Analyses

Personal goals and goal commitment. The analysis of personal goals revealed that those in the three incentive pay groups set significantly higher personal goals than
those in the wage pay group, and while personal goal level was positively correlated with performance, the results were more ambiguous when analyzed by group. Piece-rate pay resulted in a stronger correlation between performance and personal goals than wage pay or threshold piece-rate pay, however there was no significant difference in the correlations between wage pay, threshold piece-rate pay, and bonus pay. However, the existence of a correlation between personal goals and performance does not indicate the size of the effect of goal-setting, as those in the groups with a strong correlation between performance and personal goals did not have significantly higher performance.

The analysis of goal commitment showed no significant differences in goal commitment between any of the four pay groups, but it did show a significant drop in goal commitment after the first experimental session. This could be interpreted as the effect of participants contacting the contingencies after the first experimental session. Some participants may have begun the experiment with high levels of goal commitment but after the first session it became more apparent which goals they would have been able to actually attain and commitment was adjusted accordingly.

**Secondary analyses.** Interestingly, task performance was found to be positively correlated to accuracy on the task. The highest performers were not only able to complete more correct records, but they also had proportionately fewer errors than lower performers. This indicates that increased performance did not adversely affect performance quality. This is likely because the contingency in the present study required both quantity and quality to earn reward, as only correctly completed records were counted for goal attainment and incentive pay. The highest correlation was found between rate and time on task ($r = .96$), replicating the results of past studies that have examined
this experimental task (Mcgee, Dickinson, Huitema, & Culig, 2006; Urschel, 2014). The time on task data also indicated that participants spent significantly less time on task as the study progressed. This contradicts the performance data that showed no differences in performance across time, but supports the goal commitment data. Further, a visual analysis of the time on task data suggests that those in the piece-rate pay group maintained their performance across time, whereas those in the other groups did not, which would support the findings of Johnson et al. (2008) and Matthews and Dickinson (2000). Such data warrant further investigation.

**Limitations**

In the present study, there were a number of potential limitations that may have affected the outcome. First, it is possible that there was a true difference between means, but there was insufficient power to detect that difference. The substantial variability in performance, paired with the apparent effectiveness of goals and feedback in the wage pay group appears to have significantly decreased the experimental power. In fact, a post-hoc power analysis showed that a sample size of 67 for each of the four groups would have been required to produce a .8 probability of detecting a significant difference of 45 correct entries (the observed maximum difference in adjusted means), given the variability in the present study. Further, secondary measures such as time on task, accuracy, rate, goal commitment, and personal goals suggest that a true difference may exist.

Second, while participants were recruited from a number of different sources, the vast majority of the participants came from an introduction to psychology course in which extra credit was available for participation in research. Many of these participants
indicated that they were participating primarily for extra credit, rather than the opportunity to earn pay. It is very possible that the availability of extra credit for completion of the study may have introduced another source of control, which may have overshadowed the effects of the pay systems. Participants who were only interested in the extra credit may have substantially decreased their performance when it became apparent that their performance did not affect their opportunity to earn extra credit. Alternatively, when the goals were introduced and participants were encouraged to do their best, they may have generated a false rule that doing their best was required to earn extra credit. While all participants contacted the pay-performance contingency several times throughout the study, they only contacted the contingency that extra credit was available regardless of performance at the very end of the study. If extra credit was a powerful reward maintaining their participation in the study, many participants may have been “playing it safe” by exerting high levels of effort to ensure the extra credit was earned. In a real work setting this would be similar to an employee initially performing well on the job until he contacted the true standards, and adjusted his performance accordingly. Such variables warrant further investigation.

Third, some participants reported that the pay was not enough for them to care about how well they performed. While it is possible that the total pay amount available was not enough to sufficiently interest participants, past research has shown that variable pay amounts much less than those used in the present study were sufficient to affect performance (Dickinson & Gillette, 1993; Frisch & Dickinson, 1990; D. A. Johnson et al., 2008).
Fourth, many participants commented that the 45-minute work session was not long enough for them to become sufficiently bored to access alternative activities. Yet, the time on task data indicated that there was a significant drop in time spent working (and presumably an increase in time accessing alternate activities) as the sessions progressed. Further, those in the wage pay group spent on average 14% of the work session off task, whereas those in the incentive pay groups spent between 10% and 3.5% of the work session off task (see Table 11). While these differences were not statistically significant, past research using similar off-task activities showed that individuals in wage pay groups spent significantly less time on task than those paid monetary incentives (D. A. Johnson et al., 2008; Matthews & Dickinson, 2000). In the present study such differences may have been obscured by the large variability in time on task, and it is possible that a longer work period would allow the effects of the independent variable to stand.

Finally, as is the case with all lab studies, it is possible that the results would have been different if the study had been conducted in an actual work setting. There are two justifications for conducting studies like this one in the lab: (a) the difficulty of conducting incentive research in applied settings, and (b) the results of several meta-analyses that support the generality of both monetary incentive and goal-setting lab research. With respect to the first justification, Frisch and Dickinson (1990) argued that it is often unrealistic to conduct incentive research in applied settings because most companies would not, understandably, allow researchers to experimentally manipulate pay systems in a way that would produce scientifically valid results. If research were restricted to field studies, fewer studies could be conducted which would greatly limit
what is known about the effects of various pay systems. Further, there are typically more extraneous variables that can affect performance in an applied setting, making conclusions difficult to draw. In a review of the *Journal of Organizational Behavior Management* from 1977 (its inception) through 1986, Balcazar, Shupert, Daniels, Mawhinney, and Hopkins (1989) acknowledged the contribution of lab studies, stating “simulation researchers can provide a great service to those working in the field if they study phenomena which are modeled from but cannot be effectively or economically evaluated in the field” (p. 35).

With respect to the second justification, a number of researchers have compared the results of lab and field studies that have investigated monetary incentives (Garbers & Konradt, 2014; Jenkins et al., 1998; Jenkins, 1986) and goal setting (Latham & Lee, 1986; Locke, 1986). All concluded that the results of the two types of studies were similar. More generally, in an analysis of effect sizes from a number of meta-analyses comparing lab and field studies, Mitchell (2012, p. 111) found a correlation of .89 (n=72, 95% CI [.83, .93]) for lab and field studies conducted in Industrial Organizational Psychology.

**Future Research**

The results of this study present a number of possible extensions for future research. Given past research indicating the effectiveness of monetary incentive systems in improving performance above wage pay, the non-effect found in the present study suggests that monetary incentive systems may be conditionally effective. Analyzing the effects of tiered goals and pay systems in isolation would provide very useful data. Specifically, an analysis of the difference in performance between wage pay and piece-
rate pay with and without goals would help to show the extent to which goals affect performance. Additionally, examining a tiered goal system in which the performance goals were more appropriately scaled could produce different results than the present study. Practically speaking, replicating this finding that a tiered goal system can produce performance with wage pay that is comparable to incentive pay could be very useful to organizations. Incentive pay systems can be difficult to establish both technically and politically, and if comparable effects can be obtained through the use of effective goal-setting then organizations may prefer this simpler option.

Future research could also explore the extent to which bonus pay with tiered goals affects performance in real time. The high degree of variability in the present study hinted at the potential of goal-contingent pay systems to affect behavior differently than a piece-rate pay system, and a real time cumulative record of performance may show the extent to which goal attainment exerts control over behavior.

Finally, examining the effects of pay systems with longer experimental sessions may show greater effects of the independent variable, and make comparisons to an applied work setting easier.

**Conclusion**

The non-significant difference between wage pay and the three incentive pay groups suggests either a confounding variable, or that feedback and tiered goals were able to produce performance in a wage pay system comparable to that found with incentive pay. This finding is very surprising given the large amount of research that shows performance contingent monetary incentives to be a very effective means of improving performance. Yet, the large variability of performance in each group suggests there may
have been an interaction between the 5-tiered goal system and the type of pay used, but the present study was unable to detect such a difference.

In either case, these findings help to strengthen the important point that rewards do not have absolute value. While monetary incentives may be an effective reward for many individuals this does not mean that they are necessarily the most effective. In the present study it appears that, for many performers, performance goals provided a source of reward and motivating operations that rivaled those provided by monetary incentives. For the applied practitioner this simply means that the effects of a given consequence must be measured and evaluated to determine its effectiveness as a reinforcer, rather than assuming that a particular reward, such as money, will be uniformly effective for all performers. Fortunately this is already best practice in the field of behavior analysis.
REFERENCES


APPENDICES
Appendix A
Recruitment Script
Hello, my name is Dan Sundberg. I am a graduate student in psychology and I am looking for participants for my doctoral dissertation. This project studies how individuals perform on a data entry task when they are given goals.

The data entry task is a simple, computer-based task that requires someone to read and enter numbers using a computer’s numeric keypad. The internet, as well as several computer games will be available for use during the sessions as well. The sessions will be held on campus in Wood Hall and will be 60 minutes long, 45 of which will be working on the data entry task. There will be six sessions during the semester. You will earn between $27- $41.50 if you complete the entire study.

In order to participate, you must not have participated in other studies that have utilized the medical data entry task, must not have taken Organizational Psychology (PSY 3440) or I/O Psychology (PSY 4440). You must also play computer games or use the internet recreationally at least five hours per week, and be available for 6 sessions throughout the Fall 2014 semester. You may schedule only one session per day.

Your participation is voluntary and you may withdraw from the study at any time. If you do choose to withdraw, you will be paid for your participation up to the point of withdrawal. Your participation, lack thereof, or withdrawal from the study will not affect your grade in this class or any other. Your identity and your performance in this study will be kept confidential.

If you are interested in participating and you would like further information about this study, please print your name, phone number, email address, and best times to reach you on a piece of paper and give it to me. I am also passing out a piece of paper with my information so that you may contact me if you prefer.

Thank you for your time and for any of you who choose to participate, thank you in advance for your help with my dissertation!
Appendix B
Potential Participant Questionnaire
<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sex: Male</td>
<td>Female</td>
<td></td>
</tr>
<tr>
<td>2. Age:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Have you ever participated in a study at WMU that required you to use a medical data entry task?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>4. Have you taken, or are you currently taking, either of the following classes?</td>
<td>PSY 3440, Organizational Psychology</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>PSY 4440, Industrial/Organizational Psychology</td>
<td>Yes</td>
</tr>
<tr>
<td>5. Do you currently or have you held a position that involved data entry?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>6. On average, how many hours per week do you play computer games or access the internet for recreational purposes?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix C
Consent Form
Western Michigan University  
Department of Psychology

Principal Investigator: Alyce M. Dickinson, Ph.D.  
Student Investigator: Daniel B. Sundberg, M.S.  
Title of Study: The Effects of Tiered Goals on Performance

You have been invited to participate in a research project titled “The Effects of Tiered Goals on Performance.” This project will serve as Dan Sundberg’s dissertation under the supervision of Alyce Dickinson, Ph.D.

This consent document will explain the purpose of this research project and will go over the time commitments, the procedures used in the study, and the risks and benefits of participating in this research project. Please read this consent form carefully and completely and please ask any questions if you need more clarification.

What are we trying to find out in this study?
This study aims to gather information about individuals’ performance levels on a computerized data entry task when given goals for five different performance levels.

Who can participate in this study?
We are recruiting college students enrolled in courses at Western Michigan University. There are five criteria you must meet to participate. You must play computer games or use the internet for entertainment purposes at least five hours per week. You must not be or have been employed in a data entry position. You must not have previously participated in research that required you to use a medical data entry task. You must not have taken either Organizational Psychology (PSY 3440) or Industrial/Organizational Psychology (PSY 4440). Finally, you must be available for six 60-minute sessions throughout the Fall 2014 semester.

Where will this study take place?
You will work in Wood Hall, Room 2532, which is Dr. Dickinson’s research laboratory.

What is the time commitment for participating in this study?
You must be available for six 60-minute sessions throughout the semester.

What will you be asked to do if you choose to participate in this study?
You will be asked to perform a computer-based medical data entry task, a task designed to simulate the job of a medical transcriptionist. The computer program will provide data corresponding to “patients.” You will first look for the “Patient ID number” and type it into the correct location. Then, you will look at whether the patient is male or female and based on the ranges provided for the respective gender, you will determine whether the patient’s data is “within range” or “outside of range” by clicking the appropriate button. After your last experimental session, you will be asked to answer questions about your
experiences during the study. Following that, your performance during the study will be reviewed and any questions you have about the study will be answered.

**What information is being measured during the study?**
The computer will automatically take measures of your performance on the medical data entry task. Also, at the end of the study, you will be asked to indicate your satisfaction with the procedures in the study and to indicate whether you felt more stress at one point in time versus another.

**What are the risks of participating in this study and how will these risks be minimized?**
You may experience some minor physical discomfort, minor fatigue, or minor stress when you are performing the task. These risks will be minimized by the fact that you will be able to take breaks whenever you want during the session. During these breaks, you may choose to play one of several computer games, surf the internet or just relax.

**What are the benefits of participating in this study?**
You will be contributing to the field of research on goal setting and performance. You may also learn about this research through participation in the study. This study will add to our understanding of how working conditions affect performance, satisfaction and stress. The findings from laboratory studies such as this can be applied in the workplace.

**Are there any costs associated with participating in this study?**
Besides the relatively large time commitment, there are no costs associated with participation in this study.

**Is there any compensation for participating in this study?**
For each 60-minute session including the training session, you will earn between $4.50 and $7.50, depending on the group you are assigned to and your performance. You will be paid in cash at the end of the 6th and final session. If you decide to withdraw from this study, you will be paid for your performance up to the point of withdrawal.

**Who will have access to the information collected during this study?**
The principal investigator, the student investigator, and the research assistants will have access to the information collected during this study. When you begin the study, you will be assigned a number so that your individual progress can be tracked while your identity is held strictly confidential. When the data of the study are presented or published, only your participant number will be used to identify you. Neither your name nor any identifying characteristics will be used.

**What if you want to stop participating in this study?**
You can choose to stop participating in the study at any time for any reason, without penalty. The investigator can also decide to stop your participation in the study without your consent. If you do not finish the study, you will be paid for your participation up to the point of withdrawal.
If you have any questions before or during the study, you may email Dan Sundberg at Daniel.B.Sundberg@wmich.edu. You may also contact the primary investigator, Dr. Alyce Dickinson at 269-387-4473, the Chair, Human Subjects Institutional Review Board at 269-387-8293 or the Vice President for Research at 269-387-8298 if questions arise during the course of the study.

This consent document has been approved for use for one year by the Human Subjects Institutional Review Board (HSIRB) as indicated by the stamped date and signature of the board chair in the upper right corner. Do not participate in this study if the stamped date is older than one year.

--------------------------------------------------------------------------------------------------------

I have read this informed consent document. The risks and benefits have been explained to me. I agree to take part in this study.

______________________________________________________________________________________________

Please Print Your Name

______________________________________________________________________________________________

Participant’s signature __________________________ Date __________________________
Appendix D
HSIRB Research Approval Letter
Date: August 15, 2014

To: Alyce Dickinson, Principal Investigator  
    Daneil Sundberg, Student Investigator for dissertation

From: Amy Naugle, Ph.D., Chair

Re: HSIRB Project Number 14-08-13

This letter will serve as confirmation that your research project titled “The Effects of Incentive Pay Systems with Tiered Goals on Performance” has been approved under the expedited 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: This research may only be conducted exactly in the form it was approved. You must seek specific board approval for any changes in this project (e.g., you must request a post approval change to enroll subjects beyond the number stated in your application under “Number of subjects you want to complete the study”). Failure to obtain approval for changes will result in a protocol deviation. In addition, if there are any unanticipated adverse reactions 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.

Reapproval of the project is required if it extends beyond the termination date stated below.

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

Approval Termination: August 14, 2015
Appendix E
Medical Task Screenshot
Appendix F
Hypothetical Spreadsheet for Participant
<table>
<thead>
<tr>
<th>Phase</th>
<th>Session</th>
<th># Correct records</th>
<th>Accuracy</th>
<th>Time on task</th>
<th>Records/minute</th>
</tr>
</thead>
<tbody>
<tr>
<td>DO YOUR BEST</td>
<td>1</td>
<td>343</td>
<td>97.2</td>
<td>28.5</td>
<td>12.05</td>
</tr>
<tr>
<td>PIECE-RATE</td>
<td>2</td>
<td>389</td>
<td>96.7</td>
<td>27.5</td>
<td>14.1</td>
</tr>
<tr>
<td>PIECE-RATE</td>
<td>3</td>
<td>405</td>
<td>98.9</td>
<td>29.0</td>
<td>13.9</td>
</tr>
<tr>
<td>PIECE-RATE</td>
<td>4</td>
<td>403</td>
<td>99.3</td>
<td>27.0</td>
<td>14.93</td>
</tr>
<tr>
<td>PIECE-RATE</td>
<td>5</td>
<td>412</td>
<td>99.1</td>
<td>25.0</td>
<td>16.5</td>
</tr>
<tr>
<td>PIECE-RATE</td>
<td>6</td>
<td>408</td>
<td>100</td>
<td>28.5</td>
<td>14.3</td>
</tr>
</tbody>
</table>
Appendix G
Commitment Questionnaire
<table>
<thead>
<tr>
<th>Level 1 Goal: 300 records</th>
<th>Not at all</th>
<th>Slightly</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How committed are you to this goal?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. To what extent do you care about this goal?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. How dedicated are you to this goal?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. To what extent have you chosen to be committed to this goal?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 2 Goal: 395 records</th>
<th>Not at all</th>
<th>Slightly</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How committed are you to this goal?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. To what extent do you care about this goal?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. How dedicated are you to this goal?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. To what extent have you chosen to be committed to this goal?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 3 Goal: 450 records</th>
<th>Not at all</th>
<th>Slightly</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How committed are you to this goal?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. To what extent do you care about this goal?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. How dedicated are you to this goal?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. To what extent have you chosen to be committed to this goal?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 4 Goal: 495 records</th>
<th>Not at all</th>
<th>Slightly</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How committed are you to this goal?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. To what extent do you care about this goal?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. How dedicated are you to this goal?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. To what extent have you chosen to be committed to this goal?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 5 Goal: 525 records</th>
<th>Not at all</th>
<th>Slightly</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How committed are you to this goal?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. To what extent do you care about this goal?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. How dedicated are you to this goal?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. To what extent have you chosen to be committed to this goal?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Personal Goal</th>
<th>1. Do you have a personal goal for today’s session?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. If yes, what is that goal?</td>
<td>____ correctly completed records</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Appendix H
Instructional Scripts
TRAINING SESSION (ALL GROUPS)

After the informed consent form is signed and participants are accepted into the study, the participant will practice the task for 10 minutes. Take the participant into the lab, and explain the task to him/her. Point out the various parts of the task as you are explaining them:

“If you have a cell phone, please silence it now and before all sessions. Before you begin the study, we’d like you to get comfortable with the task, which is designed to simulate the job of a medical data entry clerk. The computer program will provide you with data corresponding to patients. You should first look for the “Patient ID number” and type it into the correct location (the blank “PATIENT ID” box). Then, look at whether the patient is male or female and, based on the ranges provided for the respective gender, determine whether the patient’s data are “within range” or “outside of range” by clicking the appropriate button. When you are satisfied with your response, click the “submit” button to close the current patient’s record and generate the next record. Let’s try one.”

Have the participant complete a record. Ask if there any questions about the task. If so, answer questions.

“The computer will keep a running total of the number of completed and correctly completed records. You can check your progress at any time. Each computer has access to the internet, as well as 6 computer games available for play at any time: Solitaire, Bejeweled, Mahjong, Text Twist, Jewel Quest, and Angry Birds. You are welcome to play these games or surf the internet at any time during the sessions, or just take a break and relax. If you choose to play any of the games or access the internet you may minimize the data entry task, but under no circumstances should you close the program. Additionally, I ask that you do not use the sound on the computer, so you do not disturb any other research participants. Today, we’d like you to practice the task for 10 minutes. I will come back after 10 minutes to turn off the task and schedule your sessions.”

Return after 10 minutes. Record these data on the participant’s spreadsheet. Schedule subsequent sessions with the participant in the room used for greeting.
SESSION 1: DO YOUR BEST SESSION (ALL GROUPS)

As in the practice session,

“If you have a cell phone, please silence it during the session. During this 45-minute session, do your best to correctly complete as many records as you can. Remember you can always see how many records you have completed correctly. You may take a break whenever you like for as long as you like. You may play one of the computer games as a break, access the internet, or you may also just stretch and relax. After I start the medical entry task, I will be available on the other side of the cubicle wall. If you need anything during the session, I will be behind the partition. Just come get me. Remember, it is very important that you complete as many records as you can. Do you have any questions?”

Answer any participant questions. Set the timer for 45 minutes and start the task. After 45 minutes, return and stop the task program. Record values on the participant’s spreadsheet and schedule or remind the participant of any subsequent sessions with the participant in the room used for greeting.
SESSION 2 (WAGE PAY)

Before the session begins (in the room used for greeting):

“I have a receipt showing your performance during the last session. In your last session, you correctly completed ____ records. You earned $4.50 for the initial session. In the remaining sessions, you will earn $6.50 in total pay. Please keep this with you for the upcoming session for your reference. Here’s a graph showing your performance from the first session.”

Show the participant his/her graph.

“Session number is marked along the X axis and the number of correctly completed records is marked along the Y axis. You can see there are five goal lines on the graph as well. You will earn your $6.50 regardless of how many goals you reach, but I would encourage you to try and meet as many goals as you can. Do you have any questions about the graph, the goals, or your pay for the remaining sessions?”

Answer any participant questions.

“To ensure you understand the goals and pay structure, I’d like you to complete a short quiz over the pay system and complete a short questionnaire.”

Give the participant the wage pay quiz. Once they have completed the quiz compare their answers to the answer key. For any missed items, review the computation with the participant and administer the next form of the quiz. Continue this until participants complete the quiz with 100% accuracy. Once they are done, give participant the Commitment Questionnaire. After the participant has finished the questionnaire, show the participant to the work area.

“If you have a cell phone, please silence it during the session. Remember you can always see how many records you have completed correctly. Please remember that you can take a break from the task at any time. You can play the computer games, access the internet, or just sit and relax for as long as you want to. I will be behind the partitions if you need me. I will come to your work area after 45 minutes to end the session. Then we’ll confirm your next session. Do you have any questions?”

Answer any participant questions. Set the timer for 45 minutes and start the task. After 45 minutes, return and stop the task program. Record values on the participant’s spreadsheet and schedule any subsequent sessions with the participant in the room used for greeting.
SESSIONS 3-6 (WAGE PAY CONDITION)

Before each session begins (in the room used for greeting):

“I have a receipt showing your performance during the last session. In your last session, you correctly completed ____ records. Please keep this with you for the upcoming session for your reference. You earned $6.50 total for the last session.”

Show the participant his/her graph.

*Here again is the short questionnaire regarding your feelings towards the goals. Please answer these questions as accurately as possible.*

Give the participant the Commitment Questionnaire. After the participant has finished the questionnaire, show the participant to the work area.

“If you have a cell phone, once again please silence it during the session. Remember you can always see how many records you have completed correctly. Please remember that you can take a break from the task at any time. You can play the computer games, access the internet or just sit and relax for as long as you want to. I will be behind the partitions if you need me. I will come to your work area after 45 minutes to end the session. Then we’ll confirm your next session.”
SESSION 2 (PIECE-RATE PAY)

Before the session begins (in the room used for greeting):

“I have a receipt showing your performance during the last session. In your last session, you correctly completed ____ records. You earned $4.50 in base pay for the initial session. In the remaining sessions, you will still earn $4.50 in base pay, but you will also have an opportunity to earn incentive pay based on your performance. Please keep this with you for the upcoming session for your reference. Here’s a graph showing your performance from the first session.”

Show the participant his/her graph as well as the pay table.

“Session numbers are marked along the X axis and the number of correctly completed records is marked along the Y axis. For each record you complete correctly you will earn $0.0057. You can see there are five goal lines on the graph as well. You can earn incentives until you reach the final goal of 525 records, after which point you will receive no additional payout. Here’s a sheet of paper that explains the pay system in detail. It’s hard to keep track of $0.0057 per record, so here is a chart that indicates how much extra pay is associated with each goal. Of course you receive a per-piece incentive for in between the goals as well. Thus, if you correctly complete 400 records you would earn $4.50 in base pay, and $2.28 in incentive pay for a total of $6.78. This amounts to a total possible incentive of $3.00 per session PLUS your base pay rate of $4.50 for a total of $7.50 per session. You will receive your incentive pay regardless of the number of goals you reach, but I encourage you to reach as many as you can. Do you have any questions about the graph, the goals, or your pay for the remaining sessions?”

Answer any participant questions.

“To ensure you understand the goals and pay structure, I’d like you to complete a short quiz and questionnaire before you begin the session. You may use a calculator or a cell phone to complete the quiz. If you do not have a calculator I can provide you with one.”

Give the participant the piece-rate pay quiz. Once they have completed the quiz compare their answers to the answer key. For any missed items, review the computation with the participant and administer the next form of the quiz. Continue this until participants complete the quiz with 100% accuracy. Once they are done, give participant the Commitment Questionnaire. After the participant has finished the questionnaire, show the participant to the work area.

“If you have a cell phone, please silence it during the session. Remember you can always see how many records you have completed correctly. Please remember that you can take a break from the task at any time. You can play the computer games, access the internet, or just sit and relax for as long as you want to. I will be behind the partitions if you need
me. I will come to your work area after 45 minutes to end the session. Then we’ll confirm your next session. Do you have any questions?”

Answer any participant questions. Set the timer for 45 minutes and start the task. After 45 minutes, return and stop the task program. Record values on the participant’s spreadsheet and schedule any subsequent sessions with the participant in the room used for greeting.
SESSIONS 3-6 (PIECE-RATE PAY)

Before each session begins (in the room used for greeting):

“I have a receipt showing your performance during the last session. In your last session, you correctly completed _____ records. You earned $4.50 in base salary and $____ in incentive pay. So you earned $____ total for the last session. Please keep this with you for the upcoming session for your reference.”

Show the participant his/her graph.

*Here again is the short questionnaire regarding your feelings towards the goals. Please answer these questions as accurately as possible.*

Give the participant the Commitment Questionnaire. After the participant has finished the questionnaire, show the participant to the work area.

“If you have a cell phone, please silence it during the session. Remember you can always see how many records you have completed correctly. Please remember that you can take a break from the task at any time. You can play the computer games, access the internet, or just sit and relax for as long as you want to. I will be behind the partitions if you need me. I will come to your work area after 45 minutes to end the session. Then we’ll confirm your next session.”
SESSION 2 (THRESHOLD PIECE-RATE PAY)

Before the session begins (in the room used for greeting):

“I have a receipt showing your performance during the last session. In your last session, you correctly completed ____ records. You earned $4.50 in base pay for the initial session. In the remaining sessions, you will still earn $4.50 in base pay, but you will also have an opportunity to earn incentive pay based on your performance. Please keep this with you for the upcoming session for your reference. Here’s a graph showing your performance from the first session.”

Show the participant his/her graph as well as the pay table.

“Session numbers are marked along the X axis and the number of correctly completed records is marked along the Y axis. You can see there are five goal lines on the graph as well. This pay table shows the incentive payout changes based on the goal level reached. For example, if you complete 350 records you will earn $1.155 in incentive pay, plus $4.50 in base pay, for a total of $5.655. You can earn up to $3.00 per session in incentive pay PLUS your base pay rate of $4.50 for a total of $7.50 per session. Do you have any questions about the graph, the goals, or your pay for the remaining sessions?”

Answer any participant questions.

“To ensure you understand the goals and pay structure, I’d like you to take a short quiz. After that you will fill out a questionnaire before you begin this session and all session to follow. You may use a calculator or a cell phone to complete the quiz. If you do not have a calculator I can provide you with one.”

Give the participant the threshold pay quiz. Once they have completed the quiz compare their answers to the answer key. For any missed items, review the computation with the participant and administer the next form of the quiz. Continue this until participants complete the quiz with 100% accuracy. Once they are done, give participant the Commitment Questionnaire. After the participant has finished the questionnaire, show the participant to the work area.

“If you have a cell phone, please silence it during the session. Remember you can always see how many records you have completed correctly. Please remember that you can take a break from the task at any time. You can play the computer games, access the internet, or just sit and relax for as long as you want to. I will be behind the partitions if you need me. I will come to your work area after 45 minutes to end the session. Then we’ll confirm your next session. Do you have any questions?”

Answer any participant questions. Set the timer for 45 minutes and start the task. After 45 minutes, return and stop the task program. Record values on the participant’s spreadsheet and schedule any subsequent sessions with the participant in the room used for greeting.
SESSIONS 3-6 (THRESHOLD PIECE-RATE PAY)

Before each session begins (in the room used for greeting):

“I have a receipt showing your performance during the last session. In your last session, you correctly completed _____ records. You earned $4.50 in base salary and $____ in incentive pay. So you earned $____ total for the last session. Please keep this with you for the upcoming session for your reference.”

Show the participant his/her graph as well as the pay table.

*Here again is the short questionnaire regarding your feelings towards the goals. Please answer these questions as accurately as possible.*

Give the participant the Commitment Questionnaire. After the participant has finished the questionnaire, show the participant to the work area.

“If you have a cell phone, please silence it during the session. Remember you can always see how many records you have completed correctly. Please remember that you can take a break from the task at any time. You can play the computer games, access the internet, or just sit and relax for as long as you want to. I will be behind the partitions if you need me. I will come to your work area after 45 minutes to end the session. Then we’ll confirm your next session.”
SESSION 2 (BONUS PAY)

Before the session begins (in the room used for greeting):

“I have a receipt showing your performance during the last session. In your last session, you correctly completed ____ records. You earned $4.50 in base pay for the initial session. In the remaining sessions, you will still earn $4.50 in base pay, but you will also have an opportunity to earn bonus pay based on your performance. Please keep this with you for the upcoming session for your reference. Here’s a graph showing your performance from the first session.”

Show the participant his/her graph as well as the pay table.

“Session numbers are marked along the X axis and the number of correctly completed records is marked along the Y axis. You can see there are five goal lines on the graph as well. The payouts are shown on this table here too. The Level 1 goal is to complete 300 records during the 45-minute work session. If you correctly complete 300 records, you will earn $1 in bonus pay, $5.50 total for the session. If you reach the Level 2 goal by correctly completing 395 records, you will earn $1.50 in bonus pay, $6.00 total. If you reach the Level 3 goal by correctly completing 450 records, you will earn $2 in bonus pay, $6.50 total for the session. If you reach the Level 4 goal by correctly completing 490 records, you will earn $2.50 in bonus pay, $7.00 total. If you reach the Level 5 goal by correctly completing 525 records, you will earn $3 in bonus pay, $7.50 total for the session. Do you have any questions about the graph, the goals, or your pay for the remaining sessions?”

Answer any participant questions.

“To ensure you understand the goals and pay structure, you’ll take a short quiz to ensure that you understand how you will be paid in the sessions to follow. After that you will fill out a questionnaire before you begin this session and all session to follow. You may use a calculator or a cell phone to complete the quiz. If you do not have a calculator I can provide you with one.”

Give the participant the bonus pay quiz. Once they have completed the quiz compare their answers to the answer key. For any missed items, review the computation with the participant and administer the next form of the quiz. Continue this until participants complete the quiz with 100% accuracy. Once they are done, give participant the Commitment Questionnaire. After the participant has finished the questionnaire, show the participant to the work area.

“If you have a cell phone, please silence it during the session. Remember you can always see how many records you have completed correctly. Please remember that you can take a break from the task at any time. You can play the computer games, access the internet, or just sit and relax for as long as you want to. I will be behind the partitions if you need
me. I will come to your work area after 45 minutes to end the session. Then we’ll confirm your next session. Do you have any questions?"

Answer any participant questions. Set the timer for 45 minutes and start the task. After 45 minutes, return and stop the task program. Record values on the participant’s spreadsheet and schedule any subsequent sessions with the participant in the room used for greeting.
SESSIONS 3-6 (BONUS PAY)

Before each session begins (in the room used for greeting):

“I have a receipt showing your performance during the last session. In your last session, you correctly completed _____ records. You earned $4.50 in base salary and $____ in bonus pay. So you earned $____ total for the last session. Please keep this with you for the upcoming session for your reference.”

Show the participant his/her graph as well as the pay table.

*Here again is the short questionnaire regarding your feelings towards the goals. Please answer these questions as accurately as possible.*

Give the participant the Commitment Questionnaire. After the participant has finished the questionnaire, show the participant to the work area.

“If you have a cell phone, please silence it during the session. Remember you can always see how many records you have completed correctly. Please remember that you can take a break from the task at any time. You can play the computer games, access the internet, or just sit and relax for as long as you want to. I will be behind the partitions if you need me. I will come to your work area after 45 minutes to end the session. Then we’ll confirm your next session.”
Appendix I
Pay Quizzes
Wage Pay 1:

Each participant earns $6.50 per session

1. Steve has correctly entered 387 medical records for a session. How much money did Steve earn for that session?

2. Lina has correctly entered 550 medical records for a session. How much money did Lina earn for that session?

3. Shawn has entered 300 medical records for a session. 250 of those were entered correctly. How much money did Shawn earn for that session?
Wage Pay 2

Each participant earns $6.50 per session

1. Brandon has correctly entered 450 medical records for a session. How much money has Brandon earned for that session?

2. Liana has entered 395 medical records for a session. 390 of those records were entered correctly. How much money has Liana earned for that session?

3. Ashley has correctly entered 289 medical records for a session. How much money has Ashley earned for that session?
Wage Pay 3

Each participant earns $6.50 per session

1. Doug has correctly entered 515 medical records for a session. How much money has Doug earned for that session?

2. Jessica correctly entered 145 records for a session. How much money has Jessica earned for that session?

3. Greg entered 487 medical records for a session. 463 of those were correct. How much money has Greg earned for that session?
Piece-Rate Pay 1

Each participant earns $4.50 in base pay + $0.0057 per correctly entered record. You may use a calculator to complete this quiz.

1. James has correctly entered 290 medical records during a session. How much money has James earned for that session?

2. Anna has entered 439 medical records during a session. Of those 431 were correct. How much money has Anna earned for that session?

3. Kyle has correctly entered 542 medical records during a session. How much money has Kyle earned for that session?
Piece-Rate 2

Each participant earns $4.50 in base pay + $0.0057 per correctly entered record. You may use a calculator to complete this quiz.

1. Nick has entered 459 medical records. 450 of those were entered correctly. How much money has Nick earned for that session?

2. Chris has correctly entered 399 medical records during a session. How much money has Chris earned during that session?

3. Rachel has correctly entered 560 medical records during a session. How much money has Rachel earned during that session?
Piece-Rate 3

Each participant earns $4.50 in base pay + $0.0057 per correctly entered record. You may use a calculator to complete this quiz.

1. Christina has entered 545 medical records during a session. Of those 526 were correct. How much money has Christina earned for that session?

2. Bret has correctly entered 405 medical records during a session. How much money has Bret earned for that session?

3. Larson has entered 197 medical records during a session. Of those 184 were correct. How much money has Bret earned for that session?
Threshold Pay

Each participant earns $4.50 in base pay plus incentive pay based on the following chart. You may use a calculator to complete this quiz.

<table>
<thead>
<tr>
<th>Goal</th>
<th>Range</th>
<th>Amount Per Correct Record</th>
<th>Total Incentive Pay for Meeting Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>1-300 Records</td>
<td>$0.0033</td>
<td>$1.00</td>
</tr>
<tr>
<td>395</td>
<td>301-395 Records</td>
<td>$0.0038</td>
<td>$1.50</td>
</tr>
<tr>
<td>450</td>
<td>396-450 Records</td>
<td>$0.0044</td>
<td>$2.00</td>
</tr>
<tr>
<td>490</td>
<td>451-490 Records</td>
<td>$0.0051</td>
<td>$2.50</td>
</tr>
<tr>
<td>525</td>
<td>491-525 Records</td>
<td>$0.0057</td>
<td>$3.00</td>
</tr>
</tbody>
</table>

1. Rachel has correctly entered 438 medical records during a session. How much money has Rachel earned for that session?

2. Lisa has correctly entered 526 medical records during a session. How much money has Lisa earned for that session?

3. Erin has entered 398 medical records during a session. Of those 384 were correctly entered. How much money has Erin earned for that session?
Threshold Pay 2

Each participant earns $4.50 in base pay plus incentive pay based on the following chart. You may use a calculator to complete this quiz.

<table>
<thead>
<tr>
<th>Goal</th>
<th>Range</th>
<th>Amount Per Correct Record</th>
<th>Total Incentive Pay for Meeting Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>1-300 Records</td>
<td>$0.0033</td>
<td>$1.00</td>
</tr>
<tr>
<td>395</td>
<td>301-395 Records</td>
<td>$0.0038</td>
<td>$1.50</td>
</tr>
<tr>
<td>450</td>
<td>396-450 Records</td>
<td>$0.0044</td>
<td>$2.00</td>
</tr>
<tr>
<td>490</td>
<td>451-490 Records</td>
<td>$0.0051</td>
<td>$2.50</td>
</tr>
<tr>
<td>525</td>
<td>491-525 Records</td>
<td>$0.0057</td>
<td>$3.00</td>
</tr>
</tbody>
</table>

1. Jacob has entered 296 medical records during a session. Of those 291 were correct. How much money has Jacob earned for that session?

2. Julius has correctly entered 458 medical records during a session. How much money has Julius earned for that session?

3. Eugene has correctly entered 515 medical records for a session. How much money has Eugene earned for that session?
Threshold Pay 3

Each participant earns $4.50 in base pay plus incentive pay based on the following chart. You may use a calculator to complete this quiz.

<table>
<thead>
<tr>
<th>Goal</th>
<th>Range</th>
<th>Amount Per Correct Record</th>
<th>Total Incentive Pay for Meeting Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>1-300 Records</td>
<td>$0.0033</td>
<td>$1.00</td>
</tr>
<tr>
<td>395</td>
<td>301-395 Records</td>
<td>$0.0038</td>
<td>$1.50</td>
</tr>
<tr>
<td>450</td>
<td>396-450 Records</td>
<td>$0.0044</td>
<td>$2.00</td>
</tr>
<tr>
<td>490</td>
<td>451-490 Records</td>
<td>$0.0051</td>
<td>$2.50</td>
</tr>
<tr>
<td>525</td>
<td>491-525 Records</td>
<td>$0.0057</td>
<td>$3.00</td>
</tr>
</tbody>
</table>

1. Mike has entered 389 medical records during a session. Of those 386 were correct. How much money has Mike earned for that session?

2. Lee has entered 544 medical records during a session. Of those 511 were correct. How much money has Lee earned for that session?

3. Stephanie has correctly entered 289 medical records during a session. How much money has Stephanie earned for that session?
**Bonus Pay 1**

Each participant earns $4.50 in base pay plus bonus pay based on the following chart. You may use a calculator to complete this quiz.

- Correctly complete **300** records to earn **$1.00** bonus (**$5.50 total**)
- Correctly complete **395** records to earn **$1.50** bonus (**$6.00 total**)
- Correctly complete **450** records to earn **$2.00** bonus (**$6.50 total**)
- Correctly complete **490** records to earn **$2.50** bonus (**$7.00 total**)
- Correctly complete **525** records to earn **$3.00** bonus (**$7.50 total**)

1. Mark has correctly completed 451 medical records during a session. How much money has Mark earned for that session?

2. Cindy has completed 532 medical records during a session. Of those 524 were correct. How much money has Cindy earned for that session?

3. John has correctly completed 297 medical records during a session. How much money has John earned for that session?
Bonus Pay 2

Each participant earns $4.50 in base pay plus bonus pay based on the following chart. You may use a calculator to complete this quiz.

- Correctly complete 300 records to earn $1.00 bonus ($5.50 total)
- Correctly complete 395 records to earn $1.50 bonus ($6.00 total)
- Correctly complete 450 records to earn $2.00 bonus ($6.50 total)
- Correctly complete 490 records to earn $2.50 bonus ($7.00 total)
- Correctly complete 525 records to earn $3.00 bonus ($7.50 total)

1. Ricky has correctly completed 529 medical records during a session. How much money has Ricky earned for that session?

2. Matt has completed 229 medical records during a session. How much money has Matt earned?

3. Karen has completed 477 medical records during a session. Of those 466 were correct. How much money has Karen earned?
Bonus Pay 3

Each participant earns $4.50 in base pay plus bonus pay based on the following chart. You may use a calculator to complete this quiz.

Correctly complete 300 records to earn $1.00 bonus ($5.50 total)
Correctly complete 395 records to earn $1.50 bonus ($6.00 total)
Correctly complete 450 records to earn $2.00 bonus ($6.50 total)
Correctly complete 490 records to earn $2.50 bonus ($7.00 total)
Correctly complete 525 records to earn $3.00 bonus ($7.50 total)

1. Phil has completed 315 medical records during a session. Of those 299 were correct. How much money has Phil earned for that session?

2. Winnie has correctly completed 355 medical records during a session. How much money has Winnie earned for that session?

3. John has correctly completed 525 medical records during a session. How much money has John earned for that session?
Answers:

Wage 1
1. $6.50
2. $6.50
3. $6.50

Wage 2
1. $6.50
2. $6.50
3. $6.50

Wage 3
1. $6.50
2. $6.50
3. $6.50

Piece-Rate 1
1. $6.15
2. $6.96
3. $7.50

Piece-Rate 2
1. $7.07
2. $6.77
3. $7.50

Piece-Rate 3
1. $7.50
2. $6.81
3. $5.55

Threshold 1
1. $6.43
2. $7.50
3. $5.96

Threshold 2
1. $5.46
2. $6.84
3. $7.44

Threshold 3

1. $5.97
2. $7.41
3. $5.45

Bonus 1

1. $6.50
2. $7.00
3. $4.50

Bonus 2

1. $7.50
2. $4.50
3. $6.50

Bonus 3

1. $4.50
2. $5.50
3. $7.50
Appendix J
Receipt – Wage Pay
Session 2
<table>
<thead>
<tr>
<th>Participant #</th>
<th>_____</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session #</td>
<td>_____</td>
</tr>
</tbody>
</table>

Number of correctly completed patient records in last session: __________

Pay for last session: $4.50
Pay for remaining sessions: $6.50

GOAL FOR THE REMAINING SESSIONS:
**Level 1:** Correctly complete 300 records
**Level 2:** Correctly complete 395 records
**Level 3:** Correctly complete 450 records
**Level 4:** Correctly complete 490 records
**Level 5:** Correctly complete 525 records
Appendix K
Receipt – Wage Pay
Sessions 3-6
<table>
<thead>
<tr>
<th>Participant #</th>
<th>_____</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session #</td>
<td>_____</td>
</tr>
</tbody>
</table>

| Number of correctly completed patient records in last session: | __________ |
|---------------------------------------------------------------|

Pay for last session: $6.50  
Pay for remaining sessions: $6.50

**GOAL FOR THE REMAINING SESSIONS:**

- **Level 1:** Correctly complete 300 records
- **Level 2:** Correctly complete 395 records
- **Level 3:** Correctly complete 450 records
- **Level 4:** Correctly complete 490 records
- **Level 5:** Correctly complete 525 records
Appendix L
Receipt – Piece-Rate Pay
Session 2
Participant #     _____  
Session #      _____

Number of correctly completed patient records in last session: __________

Pay for last session: $4.50
Pay for remaining sessions: $4.50 + $0.0057 per record

**GOAL AND PAY FOR THE REMAINING SESSIONS:**

<table>
<thead>
<tr>
<th>Goal</th>
<th>Amount Per Correct Record</th>
<th>Total Incentive Pay for Reaching Goal</th>
<th>Total Pay For Reaching Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1: 300 records</td>
<td>$0.0057</td>
<td>$1.71</td>
<td>$6.21</td>
</tr>
<tr>
<td>Level 2: 395 records</td>
<td>$0.0057</td>
<td>$2.25</td>
<td>$6.75</td>
</tr>
<tr>
<td>Level 3: 450 records</td>
<td>$0.0057</td>
<td>$2.56</td>
<td>$7.07</td>
</tr>
<tr>
<td>Level 4: 490 records</td>
<td>$0.0057</td>
<td>$2.80</td>
<td>$7.29</td>
</tr>
<tr>
<td>Level 5: 525 records</td>
<td>$0.0057</td>
<td>$3.00</td>
<td>$7.50</td>
</tr>
</tbody>
</table>
Appendix M
Receipt – Piece-Rate Pay
Sessions 3-6
Pay for last session: $4.50 + 0.0057$ per record entry rate: $0.0057 = $4.5000
Pay for remaining sessions: $4.50 + 0.0057$ per record

<table>
<thead>
<tr>
<th>Goal</th>
<th>Amount Per Correct Record</th>
<th>Total Incentive Pay for Reaching Goal</th>
<th>Total Pay for Reaching Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1: 300 records</td>
<td>0.0057</td>
<td>$1.71</td>
<td>$6.21</td>
</tr>
<tr>
<td>Level 2: 395 records</td>
<td>0.0057</td>
<td>$2.25</td>
<td>$6.75</td>
</tr>
<tr>
<td>Level 3: 450 records</td>
<td>0.0057</td>
<td>$2.56</td>
<td>$7.07</td>
</tr>
<tr>
<td>Level 4: 490 records</td>
<td>0.0057</td>
<td>$2.80</td>
<td>$7.29</td>
</tr>
<tr>
<td>Level 5: 525 records</td>
<td>0.0057</td>
<td>$3.00</td>
<td>$7.50</td>
</tr>
</tbody>
</table>
Appendix N
Receipt – Threshold Piece-Rate Pay
Session 2
<table>
<thead>
<tr>
<th>Participant #</th>
<th>Session #</th>
</tr>
</thead>
</table>

Number of correctly completed patient records in last session:
Pay for last session $4.50
Pay for the remaining sessions: $4.50 + records completed x per piece rate

**GOALS AND PAY FOR THE REMAINING SESSIONS**

<table>
<thead>
<tr>
<th>Goal</th>
<th>Range</th>
<th>Amount Per Correct Record</th>
<th>Total Incentive Pay for Reaching Goal</th>
<th>Total Pay for Reaching Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1: 300 records</td>
<td>1-300</td>
<td>$0.0033</td>
<td>$1.00</td>
<td>$5.50</td>
</tr>
<tr>
<td>Level 2: 395 records</td>
<td>301-395</td>
<td>$0.0038</td>
<td>$1.50</td>
<td>$6.00</td>
</tr>
<tr>
<td>Level 3: 450 records</td>
<td>396-450</td>
<td>$0.0044</td>
<td>$2.00</td>
<td>$6.50</td>
</tr>
<tr>
<td>Level 4: 490 records</td>
<td>451-490</td>
<td>$0.0051</td>
<td>$2.50</td>
<td>$7.00</td>
</tr>
<tr>
<td>Level 5: 525 records</td>
<td>491-525</td>
<td>$0.0057</td>
<td>$3.00</td>
<td>$7.50</td>
</tr>
</tbody>
</table>
Appendix O
Receipt – Threshold Piece-Rate Pay
Sessions 3-6
Pay for last session $4.50 + 0 x per record entry rate: $0.0033 = $4.5000

Pay for the remaining sessions: $4.50 + records completed x per piece rate

**GOALS AND PAY FOR THE REMAINING SESSIONS**

<table>
<thead>
<tr>
<th>Goal</th>
<th>Range</th>
<th>Amount Per Correct Record</th>
<th>Total Incentive Pay for Reaching Goal</th>
<th>Total Pay for Reaching Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1: 300 records</td>
<td>1-300</td>
<td>$0.0033</td>
<td>$1.00</td>
<td>$5.50</td>
</tr>
<tr>
<td>Level 2: 395 records</td>
<td>301-395</td>
<td>$0.0038</td>
<td>$1.50</td>
<td>$6.00</td>
</tr>
<tr>
<td>Level 3: 450 records</td>
<td>396-450</td>
<td>$0.0044</td>
<td>$2.00</td>
<td>$6.50</td>
</tr>
<tr>
<td>Level 4: 490 records</td>
<td>451-490</td>
<td>$0.0051</td>
<td>$2.50</td>
<td>$7.00</td>
</tr>
<tr>
<td>Level 5: 525 records</td>
<td>491-525</td>
<td>$0.0057</td>
<td>$3.00</td>
<td>$7.50</td>
</tr>
</tbody>
</table>
Appendix P
Receipt – Bonus Pay
Session 2
Participant # _____

Session # _____

Number of correctly completed patient records in last session: __________

Pay for last session: $4.50

**GOALS AND PAY FOR THE REMAINING SESSIONS:**

**Level 1:** Correctly complete **300** records to earn **$1.00** bonus ($5.50 total)

**Level 2:** Correctly complete **395** records to earn **$1.50** bonus ($6.00 total)

**Level 3:** Correctly complete **450** records to earn **$2.00** bonus ($6.50 total)

**Level 4:** Correctly complete **490** records to earn **$2.50** bonus ($7.00 total)

**Level 5:** Correctly complete **525** records to earn **$3.00** bonus ($7.50 total)
Appendix Q
Receipt – Bonus Pay
Sessions 3-6
Participant #   _____
Session #     _____

Number of correctly completed patient records in last session: __________

Pay for last session:  $4.50 + $____bonus = $ ____

GOALS AND PAY FOR THE REMAINING SESSIONS:

Level 1: Correctly complete 300 records to earn $1.00 bonus ($5.50 total)

Level 2: Correctly complete 395 records to earn $1.50 bonus ($6.00 total)

Level 3: Correctly complete 450 records to earn $2.00 bonus ($6.50 total)

Level 4: Correctly complete 490 records to earn $2.50 bonus ($7.00 total)

Level 5: Correctly complete 525 records to earn $3.00 bonus ($7.50 total)
Appendix R
Graphic Feedback – Wage Pay
Pay: $6.50 Per Session
Appendix S
Graphic Feedback – Piece-Rate Pay
Pay: $4.50 + $0.0057 x number of records completed
Appendix T
Graphic Feedback – Threshold Piece-Rate Pay
Participant #

<table>
<thead>
<tr>
<th>Goal</th>
<th>Range</th>
<th>Amount Per Correct Record</th>
<th>Total Incentive Pay for Meeting Goal</th>
<th>Total Pay for Reaching Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>1-300 Records</td>
<td>$0.0033</td>
<td>$1.00</td>
<td>$5.50</td>
</tr>
<tr>
<td>395</td>
<td>301-395 Records</td>
<td>$0.0038</td>
<td>$1.50</td>
<td>$6.00</td>
</tr>
<tr>
<td>450</td>
<td>396-450 Records</td>
<td>$0.0044</td>
<td>$2.00</td>
<td>$6.50</td>
</tr>
<tr>
<td>490</td>
<td>451-490 Records</td>
<td>$0.0051</td>
<td>$2.50</td>
<td>$7.00</td>
</tr>
<tr>
<td>525</td>
<td>491-525 Records</td>
<td>$0.0057</td>
<td>$3.00</td>
<td>$7.50</td>
</tr>
</tbody>
</table>

Pay: $4.50 base +

Goal = 300: $5.50 total
Goal = 395: $6.00 total
Goal = 450: $6.50 total
Goal = 490: $7.00 total
Goal = 525: $7.50 total
Goal = 300: $5.50 total
Appendix U
Graphic Feedback – Bonus Pay
Pay: $4.50 Base +

Correctly complete **300** records to earn **$1.00** bonus (**$5.50** total)
Correctly complete **395** records to earn **$1.50** bonus (**$6.00** total)
Correctly complete **450** records to earn **$2.00** bonus (**$6.50** total)
Correctly complete **490** records to earn **$2.50** bonus (**$7.00** total)
Correctly complete **525** records to earn **$3.00** bonus (**$7.50** total)
Appendix V
Stress/Satisfaction Questionnaire
1. How satisfied were you with the pay system?
   ____ Completely satisfied
   ____ Somewhat satisfied
   ____ Neither satisfied or dissatisfied
   ____ Somewhat dissatisfied
   ____ Completely dissatisfied

2. How stressful did you find the pay system?
   ____ Not at all stressful
   ____ A little stressful
   ____ Somewhat stressful
   ____ Very Stressful
   ____ Extremely stressful
Appendix W
Debriefing Script
“Now that you have completed the study, there is one more questionnaire for you to fill out. It asks for your opinions about the pay system and any stress you may have experienced related to it. There are no incorrect answers to this questionnaire, but your thoughtful feedback is very important.”

Give participant the Stress/Satisfaction questionnaire.

“Thank you for participating in this study. Before I explain the purpose of the study, let me give you your final receipt and pay. You completed 6 sessions and earned $____.

Give the participant receipt for 6th session. Pay the participant for the entire study.

Now, let me explain the purpose of this study. This study is investigating the effects of different types of incentive systems on performance when individuals are given identical goals. We are examining the effects of 4 types of incentive systems, basic wage pay, piece-rate pay, threshold piece-rate pay in which each goal produces a higher per-piece payout, and a bonus system where reaching each goal earns you an additional payout. An important factor in this study is that all participants had roughly the same opportunity to earn additional pay, what changed was the way in which that pay was earned. We will also determine stress levels and goal strategies from your questionnaire answers. The data we obtain from this study may help businesses implement the most effective type of goal or incentive system for their employees. Does everything I said make sense? Do you have any questions? (If yes, answer questions.) Here’s how you performed during the study.

Show the participant his or her graph.

Do you have any questions about your performance during the study?

Again, thank you for your participation. I really appreciate your continued participation throughout the semester. I ask that you please do not discuss this study with anyone because we have not yet finished collecting data.