6-2022

# A Comparison Of Fixed Pay, Piece-Rate Pay, And Bonus Pay When Performers Receive Tiered Goals

Alejandro Ramos
*Western Michigan University*

# A COMPARISON OF FIXED PAY, PIECE-RATE PAY, AND BONUS PAY WHEN PERFORMERS RECEIVE TIERED GOALS

Alejandro Ramos, Ph.D.

Western Michigan University, 2022

The purpose of this study was to compare the performance of participants under three pay systems when all were given five tiered goals. Seventy-one undergraduate students were randomly assigned to receive either fixed pay, base pay with bonuses, or piece-rate pay. Over the course of six 45-minute sessions, one of which served as a covariate, participants engaged in a computerized simulated medical record data entry task. The primary dependent variable was the average number of correctly completed medical records per session. An increasing relationship was expected to be found between the three groups with respect to the number of correctly completed records, with the fixed pay group performing the worst and the piece-rate pay group performing the best. The results of a rank-based ANCOVA monotone analysis were inconsistent with this hypothesis. A one-factor ANCOVA showed that, while the fixed pay group performed significantly worse than both the base pay with bonuses group and the piece-rate pay group, the latter two groups were not significantly different from one another. These results partially replicated those of Ramos (2020), in which piece-rate pay with tiered goals outperformed fixed pay with tiered goals. The results also indicated that base pay with bonuses, when paired with tiered goals, may result in performance on par (or perhaps even better) than those of piece-rate pay with tiered goals. Finally, a comparison was made between task performance in a laboratory setting (Ramos, 2020) and in a remote setting (this study), finding that the latter resulted in

significantly lower performance for both fixed pay with tiered goals and piece-rate pay with tiered goals. However, there were some methodological differences between the two studies which present some confounds that will require further research to truly make the comparison.

# A COMPARISON OF FIXED PAY, PIECE-RATE PAY, AND BONUS PAY WHEN PERFORMERS RECEIVE TIERED GOALS

by

Alejandro Ramos

A dissertation submitted to the Graduate College
in partial fulfillment of the requirements
for the degree of Doctor of Philosophy
Psychology
Western Michigan University
June 2022

Doctoral Committee:

Douglas A. Johnson, Ph.D., Chair
Heather McGee, Ph.D.
Alyce Dickinson, Ph.D.
Gregory S. Smith, Ph.D.

## ACKNOWLEDGMENTS

It has been a long road. The world threw some wrenches in the gears, but by the grace and guidance of the following people, I was able to persevere. So, I owe them each a debt of gratitude that I hope my success in this endeavor will serve to partially fulfill.

Without Dr. Doug Johnson, I would not have had the foresight to convert this project into the remote form that it took. Doug, your guidance and flexibility were paramount. Not only with this project, but with the many other projects, courses, and excursions in which I was so fortunate to be a part. Your precision and passion with behavior analysis left not only an impression, but also a desire to emulate. Thank you for tolerating my naïveté and occasional minor bouts of insubordination.

Dr. Alyce Dickinson, my "original" advisor, without whom I would never have started down this path (despite your mild disapproval at the onset). I cannot express my gratitude enough for everything you have taught me during my tenure at WMU. You were quick to correct, but also quick to praise – in fact (and because I know this will make you laugh), there were many times when I felt as though you were my biggest cheerleader. Your mentorship and passion for teaching helped me to appreciate the positive impact that a person can have on others. I will always be grateful for the impact you have had on me.

Dr. Heather McGee, your impact in my life extends far beyond your role as a committee member. I have learned so much under your wing in so many capacities. Your efforts, enthusiasm, and involvement with us as students and mentees was a highlight of my tenure at WMU. Dr. Greg Smith, thank you for your valued input and improvements to this project. Your unique perspective helped to orient the foci of my measurements, as well as the methodology to achieve them.

**Acknowledgments—Continued**

To my parents, both of whose career paths I have somewhat inadvertently followed, my appreciation overflows. My father who spent afternoons doing schoolwork with me as a child, instilling my love for learning (as well as my perfectionism). My mother who always saw the upside, displayed patience and goodness, and led by example. Both of you, who, in my adult life, have been sounding boards, friends, counselors, and colleagues. I hope to continue making you proud, and to continue to expand upon the legacy that you have created since moving us to the United States.

My friends, who did not see near as much of me as they should have during these times. I look forward to reconnecting, strengthening our friendships, and spending more time outdoors together! I am grateful for your understanding, support, and flexibility. The beers, hangouts, trips, and more were a luxury that always served to reinvigorate me in my travails. And no, you do not have to call me ‘doctor’, now.

This list of gratitude would not be complete without the mention of my two fur-children. Siku, you arrived in my life at a time when I should not have taken on the responsibility, and yet your presence only served to help me grow further. I will never tire of seeing the joy you express while sprinting whimsically up-and-down trails, parks, and beaches, with your tongue lolling from side-to-side. You have taught me patience, allowed me to see the world as you do, given me much-needed excuses to spend more time outside, and even given me ample opportunities to practice using my behavior analytic skills. Domino… no amount of behavior analysis could ever make you stop being a sour patch kid – but I love you anyway.

Lastly, thank you to ALULA for providing the funding for this study.

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## INTRODUCTION

The mechanism behind the effectiveness of goal setting has been theorized by numerous researchers, all of whom have dissected it under their own disciplinary lens (Bandura, 1978; Fellner & Sulzer-Azaroff, 1984; Locke & Latham, 2013b). Despite the range of analyses, it has been consistently shown that goals which are specific, challenging, and achievable result in higher levels of performance (Daniels & Bailey, 2014; Fellner & Sulzer-Azaroff, 1984; Jackson & Zedeck, 1982; Lee at al., 1997; Locke & Latham, 2007; Steers & Porter, 1974). Add to this the fact that goals are relatively simple to implement, and it is easy to see why goals are so commonly used. In fact, goal setting has appeared in more than 1,000 studies over the more than 50 years that is has been used as a performance management procedure (Locke & Latham, 2013b). However, despite – or perhaps because of – its popularity and efficacy, managers may not be setting goals for their employees in an optimal manner (Chow et al., 2001; Dickinson & Gillette, 1994; Fisher et al., 2003). Notably, the greatest challenge that managers face when setting goals is ensuring that *all* of their employees find those goals to be challenging and achievable.

One possible solution to this is the use of tiered goals, which would allow for all employees to have such a goal by ensuring that there exist differing goal levels, each of which is more difficult than the previous. These differing goal levels, by nature of some being easier to attain, would make it more likely that an employee receives reinforcement for their goal-attaining behaviors and thus more likely that they would further engage in those behaviors and reach higher goal levels. To this end, earlier applied research has used tiered goals within package interventions to improve performance (Abernathy, 2001; Eikenhout & Austin, 2005; Szabo et al., 2012). Further, previous laboratory research isolated the effects of tiered goals,

showing them to be effective on their own as well as when paired with piece-rate pay (Ramos, 2020). This study aimed to extend those findings by comparing three different pay conditions while participants are given tiered goals.

**Behavioral Functions of Goals**

Analyses aimed at determining the most impactful goal characteristics are rarely conducted in organizational behavior management (OBM), despite numerous controlled experiments conducted by researchers in both the industrial/organizational (I/O) psychology and management fields. However, there are a number of theories regarding how goals and goal setting serve their behavioral functions.

Fellner and Sulzer-Azaroff (1984) were among the first to conduct a behavioral analysis of goals. They determined that goals serve as antecedent stimuli: If goals are correlated with the availability of reinforcement for meeting that goal, then they operate as discriminative stimuli ($S^D$s). As such, goals can evoke goal-directed behavior, which is in turn maintained by the reinforcement for having met that goal. It follows from this that then attaining the goal could become a conditioned reinforcer, so long as goal attainment is repeatedly followed by other reinforcers such as praise or monetary incentives. Furthermore, "… if meeting the goal is paired frequently with a positive consequence or removal of a negative stimulus, the *goal* [italics added] can function as a conditioned reinforcer" (p. 35). Fellner and Sulzer-Azaroff, however, do state that because a goal usually precedes the desired work behavior, it more likely functions as an antecedent that evokes those behaviors, and goal attainment (along with its rewards) functions as reinforcement.

While agreeing that goals can function as discriminative stimuli, Agnew (1998) maintained that they oftentimes function as motivating operations (Michael, 2004; Michael &

Miguel, 2020). Agnew's reasoning for this was that in work settings, because reinforcement for performance is typically available regardless of whether there is a goal set for that performance, this violates the definition of a discriminative stimulus. For example, if a worker is performing at a high level, their manager is likely to praise them for that performance whether a goal has been set or not. Additionally, goals also do two things: 1) they make stimuli related to that goal (e.g., the sight of a completed widget) more reinforcing and 2) they evoke work behavior aimed at meeting that goal. The latter is the result of a reinforcement history in which meeting a goal has been paired with immediate (e.g., praise) and delayed rewards (e.g., pay raises, promotions, etc.).

Arguing from a molecular perspective, however, temporal remoteness may be an issue. Although it may not always be the case, goals oftentimes do not meet the immediacy requirements to be considered discriminative stimuli. To truly function as one, the goal would immediately have to evoke behavior (Malott, 1993; Michael, 2004; Michael & Miguel, 2020). Similarly, the behavior evoked by that goal would have to be immediately followed by both a reinforcer and the stimuli which indicate goal attainment. Of course, in an organizational setting, this is particularly problematic because goals are typically based on work accomplishments (e.g., number of widgets assembled) rather than behaviors (e.g., the assembly of a widget). Following these shortcomings, goal statements have instead been conceptualized as rules that establish a relationship between a given set of behaviors and its consequences. Thus, goals evoke behaviors aimed at meeting those goals by way of some sort of verbal mediation (Ludwig & Geller, 2000).

Schlinger & Blakeley (1987) referred to rules as contingency-specifying stimuli (rather than discriminative stimuli). They indicated that rules could have a number of impacts on how the other stimuli in the environment function. For example, if a manager sets a goal for her employees (e.g., "You will receive X dollars if you produce Y widgets to meet goal Z"), that

statement would make stimuli related to that goal (e.g., the sight of the written goal or a goal line on a graph) no longer function as neutral stimuli. Rather, they would function as motivating operations or discriminative stimuli. Although the goal itself may not immediately evoke behavior, it does have function-altering properties. As such, the goal-related stimuli would then immediately evoke behavior when presented. Additionally, because the individual has been rewarded for attaining the goal, goal attainment (as well as stimuli related to progress toward the goal) could become a conditioned reinforcer.

Malott (1993) expanded on this to state that the manager's statement would likely evoke a rule stated by the individual, such as, "If I don't meet the goal, I will be criticized by my manager and lose money." Of course, criticism and loss of money are too delayed and therefore cannot directly impact goal-directed behavior (and are thus considered analogs to negative reinforcement). However, the self-statement functions as a conditioned reflexive motivating operation (Michael, 2004; Michael & Miguel, 2020) by instead making rule noncompliance (e.g., engaging in non-goal-directed behaviors) aversive. This then evokes goal-directed behavior, which, in turn, is followed by a decrease in the aversiveness caused by noncompliance (i.e., reinforcement). These behaviors will then continue to be evoked, further decreasing the aversive condition of noncompliance, until the goal is met and the self-statement is no longer valid (terminating the aversive condition). It is also worth noting that, although this is the overall process, the degree of aversiveness will vary between individuals due to idiosyncratic learning histories and so the timing of the goal-directed behavior will vary.

O'Hora and Maglieri (2006) analyzed goals from a different perspective of verbal mediation. They used relational frame theory (Hayes et al., 2001) to showcase that statements indicating a goal may evoke self-statements by the performer about their proximity to reaching

that goal (i.e., the discrepancy between their current performance and the goal). For example, as a performer creates widgets, they might say, “I have made one widget, which is 19 less than the goal; I have made two widgets, which is 18 less than the goal” and so on, until they reach the goal. As their performance nears that goal, their goal-directed behavior is reinforced by each of those self-statements. Bandura (1978) maintained a similar position through his social learning theory. He posited that the motivator for increasing performance is the difference between the current performance and the goal, identified through feedback.

In agreement with this, Locke (1986) revised his original goal-setting theory to indicate that for goals to have a motivating effect, goals *and information about current performance* (i.e., feedback) are necessary. This has been consistently supported by research (Amigo et al., 2008; Bandura & Cervone, 1983; Erez, 1977; Locke et al., 1981; Reber & Wallin, 1984). Erez (1977) used a number comparison task to compare performance when participants were given goals alone or goals with feedback. She found that for goals to improve performance, feedback was necessary. Differing from Erez, the findings of Bandura and Cervone (1983) showed that goals alone increased performance, and that performance more than doubled when feedback was added. These findings, along with others that further showcase how feedback allows performers to compare their current performance to the goal (Chhokar & Wallin, 1984; Fellner & Sulzer-Azaroff, 1984), support the aforementioned conceptual analyses which indicate that the discrepancy between current and goal performance (rather than the goal statement itself) is the important factor for goal-directed behavior.

It is worth noting, however, that if the discrepancy is excessive, it may not evoke goal-directed behavior. Both traditional goal-setting theorists and behavior analysts alike stress that goals must be challenging yet achievable if they are to improve performance (Daniels & Bailey,

2014; Fellner & Sulzer-Azaroff, 1984; Lee at al., 1997; Locke & Latham, 2007). Unfortunately, this is difficult to do (Daniels & Bailey, 2014), especially when goals are being set for a group because a goal that may be easy for some may be difficult for others. Despite this knowledge, neither traditional goal-setting theorists nor behavior analysts have investigated the best level of difficulty for goals. While the traditional group defines challenging yet achievable goals as ones which 20-50% of performers can achieve (Fatseas & Hirst, 1992; Jeffrey et al., 2012; Merchant & Manzoni, 1989), the behavioral perspective would balk at this as it means that 50-80% of performers would not meet the goals (and therefore not contact reinforcement for goal attainment). As such, the debate on the best way to set goals continues (Locke & Latham, 2013a).

## Goal-Setting Strategies

### *Stretch Goals*

Stretch goals, which are typically set so that approximately 10% of employees can achieve them (Daniels, 2009; Jeffrey et al., 2012), are commonly used in businesses due to the successes reported by companies such as Toyota, GE, and Goldman Sachs (Kerr & Landauer, 2004; Kerr & LePelley, 2013). It is worth noting, however, that the successful implementation of these goals is likely a result of complex social support as much as the numbers themselves. Regardless, while stretch goals are intended to motivate employees to achieve performance levels that they previously thought were impossible, the benefits of stretch goals are mostly based on anecdotal, uncontrolled reports (Daniels, 2009; Sitkin et al., 2011). As such, the variability of their implementations does not readily lend themselves to simple analysis. Further, the studies that have analyzed the use of stretch goals find that they have detrimental effects on performance (Chow et al., 2001; Fisher et al., 2003).

As mentioned previously, both behavior analysts and traditional goal-setting theorists express that goals set at too high of a level can be problematic for performance. From a behavioral perspective, this is explained as the result of a lack of reinforcement for (and the resulting extinction of) responses evoked by those stretch goals (Daniels & Bailey, 2014; Fellner & Sulzer-Azaroff, 1984; O'Hora & Maglieri, 2006). Even without criticism from a supervisor, failing to meet a goal may automatically punish goal-directed behavior because of the performer's history, in which their performance was punished if it was inadequate. Locke and Latham (1984), the leading goal-setting theorists in traditional psychology, stated 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)

Daniels and Bailey (2014), from a behavioral perspective, stated similarly: "Repeated failure or repeated exposure to aversive consequences despite continued efforts, leads to *learned helplessness*" (p. 245).

One experimental example of the aforementioned comes from Roose and Williams (2017), who showed that very difficult goals can result in detrimental effects on performance. In their study, they used 24 undergraduate students who were randomly assigned to either a "do your best" (control) condition or to one of two goal conditions, each with a different goal level. In one of these goal conditions, the goal was set at 150% of the participant's own baseline level; in the other, the goal was set at 175% of baseline. Throughout the experiment, participants performed a task that simulated the job of a medical data entry clerk. Participants also received both in-session and post-session feedback regarding the quantity of correct and incorrect

responses they made. All participants underwent one baseline and three experimental sessions, all of which lasted 13 minutes each. The results unequivocally showed that the 150% group performed significantly higher than the other two groups. In the 150% group, seven of the eight participants met their goal by the end of the study, compared to only one of the participants in the 175% group. Furthermore, in the 175% group, two other worrisome events occurred: (a) only about one-third of the participants *increased* their performance across goal sessions and (b) accuracy, on average, not only decreased across those goal sessions but it was significantly less than accuracy in the other two groups. These results show that, despite the anecdotal, uncontrolled reports made by companies, goals that are too difficult may indeed negatively impact performance over time (perhaps due to repeated failures to meet the goal).

***Successively Increasing Goals***

In an effort to avoid the pitfalls of stretch goals – namely performers not reaching the goal and thus not attaining reinforcement for their goal-oriented behaviors – some behavioral researchers have adapted a changing criterion design framework (Bateman & Ludwig, 2003; Ludwig & Geller, 2000; Sulzer-Azaroff et al., 1990; Wilk & Redmon, 1990, 1997). According to Klein et al., (2017) a changing criterion design "utilizes step-wise benchmarks for manipulating … a single behavior already present in an individual's repertoire," particularly where "an immediate considerable increase or decrease may be difficult to achieve or undesired; therefore, gradual shifts toward a desired goal are applied" (p. 1). Thus, where goal setting is concerned, a changing criterion design would involve, at first, setting an easily-attainable goal and then progressing the difficulty of that goal over time until the terminal goal is reached. Through the use of this methodology, goal-oriented behaviors may increase, which consequently might make

them more likely to attain each subsequent goal (Bateman & Ludwig, 2003). Daniels (2009) elaborated on this:

> By rewarding goal attainment you increase motivation and achieve subsequent goals. While small incremental goals appear to take longer to produce significant results, the opposite is true. This is because positive reinforcement accelerates performance and small goals provide more opportunities for acceleration. (p. 42)

Sulzer-Azaroff et al. (1990) leveraged this concept in their study set in a manufacturing environment. A packaged intervention (goals, feedback, praise, and nonmonetary incentives) was used to improve safety behaviors across three departments with a total of 225 employees. They employed a multiple-baseline design in which feedback and incentives were held constant during the intervention phases. What changed, however, were the goal levels, which increased in difficulty either five times (Departments 1 and 2) or six times (Department 3) over the 24-week duration of the study. As the goal difficulty increased, so too did safety achievements across all three departments – from an average of 70% during baseline to approximately 96% at the end of the intervention phase. Similarly, the number of OSHA recordables and lost-time accidents dropped respectively, from 47 to 20 and from 14 to one.

Bateman and Ludwig (2003) carried out a similar study, this time in a food distribution warehouse, focused on reducing the number of errors made by 23 employees when filling orders. In this instance, their package intervention consisted of feedback, monetary incentives, and successively *decreasing* goals (which were successively more difficult due to reducing the number of errors). Like Sulzer-Azaroff et al. (1990), they held feedback and incentives constant during the intervention. However, they differed from the earlier research in that a control group was used. For the experimental group, goals were decreased (made more difficult) every other

week for 13 weeks (a total of six times). During the study, no decrease in errors was seen in the control group, but the experimental group's errors decreased from 0.316% during baseline to 0.208% in the final phase of the intervention.

Despite the successes witnessed with these two studies, it is worth noting that the practice of increasing goals without increasing rewards can be risky. These studies were successful perhaps due to the sophistication of the researchers with behavior analysis. Sulzer-Azaroff et al. (1990) and Bateman and Ludwig (2003) were likely aware of the potential punishing effects of increasing goals without similarly increasing the rewards, indicated by the precautions they took to mitigate those effects. Sulzer-Azaroff et al. ensured that performance stabilized for about a month after meeting each sub-goal before continuing to the next goal level (as well as ensuring that supervisors provided positive weekly feedback and major celebrations each month that significant achievements were made). Bateman and Ludwig informed employees at the start of the study that goals would become more challenging every other week until the final goal was met.

However, these two quintessential examples are not always the case, particularly in industry. As Dickinson and Gillette (1994) have noted, once goals have increased a few times, employees may engage in an effort to prevent management from continuing to set even higher goals by restricting (or perhaps even decreasing) their performance. An excellent example of this can be seen in the behavioral analysis carried out by Parsons (1974) on the results of the Hawthorne studies. In his analysis, Parsons noted that employees in the Bank Wiring Room consistently performed below the goal set by management, despite receiving piece-rate pay. It turned out that employees forewent the performance standards set by management in exchange for one they set themselves in an effort to ensure a constant income. In interviews with

employees, it was revealed that they "thought that, if any excessive amount of work were turned out, the management would lower the piecework rate and the employees would therefore be in the position of doing more work for approximately the same pay" (p. 927). To this end, if any employee performed above or below the standard set by the group (not management), they were ostracized, sworn at, and, in some cases, physically punished by their peers. Of course, these practices would be considered barbaric today – but they do serve to showcase the problems that can arise from successively increasing goals without also increasing rewards. A similar argument has repeatedly been made by experts in the fields of compensation and management (Lawler, 1990; Lincoln, 1946; Snell & Bohlander, 2012).

### *Tiered Goals*

Although researchers and organizations can sidestep the issues that arise when terminal goals are set too high by instead using successively increasing goals, doing so may result in different punishing effects. To combat this, the idea of tiered goals, in which multiple goals are presented concurrently (rather than successively), may provide an alternative without the downsides. In fact, Locke (2004) suggested this method (providing higher bonuses for meeting each higher-level goal), especially when goals are paired with monetary incentives. He posited that this would likely be effective because "Highly competent employees who just miss a high-level goal still get rewarded" (p. 131). By having the multiple goals and their corresponding rewards available at the onset, tiered goals eliminate the possibility of higher levels of performance resulting in higher goals for the *same* rewards, thereby resolving the concerns with successively increasing goals. Instead, with tiered goals, the goals are constant from the beginning, and employees can receive more rewards by improving their performance to meet each of the higher goals.

In OBM, tiered goals have their place in industry, stemming from the Organizational Matrix (Riggs, 1986). This then evolved to become the Performance Scorecard (Abernathy, 1996) and the Performance Matrix (Daniels & Bailey, 2014). Both of these tools are used for managing performance and do so by providing performers with up to ten goal levels for a given behavior/result. The tools can be, and often are, used to target several different behaviors/results, with higher levels of performance being associated with differential rewards. However, these tools have commonly been used as part of a successful package intervention (Abernathy, 2001; Eikenhout & Austin, 2005; Szabo et al., 2012), and so the tools (and therefore the tiered goals) have never been experimentally isolated.

Despite the lack of experimental isolation, the effects of the tiered goals when combined with additional interventions are worth examining. In Szabo et al. (2012), researchers in a human services setting measured the performance of a clinical service review team (CSRT) through use of a scorecard. The scorecard was based on and implemented at the same time as a yes/no checklist for overseeing the completion of critical performances of nine supervisory teams (STs). The STs met every other week and the CSRT met monthly to review the decisions made by those STs. If the CSRT met or exceeded their performance criterion, which was set at 1000 points, for two consecutive months, they earned a pizza party.

During the three-month baseline, the CSRT averaged 672 points. For the three months following the introduction of the scorecard, scores were just below the criterion, but then exceeded it for the next six months and afterward, at three-, six-, and twelve-month probes. Improvements in ST performance and consumer outcomes were also present during these periods. It is worth noting, however, that during the follow-up, the CSRT did not use scorecards consistently but rather "periodically." Regardless, the authors determined that the need for

expensive organizational rewards may be reduced by using performance scorecards that link direct report and consumer performances.

Eikenhout and Austin (2005) used a within-group ABAC design in a large department store to evaluate the efficacy of a package intervention at improving customer service. That package consisted of a performance matrix, goals, feedback, and praise. There were three groups, one being cashiers (N=45) and the other two being sales associates in two different departments (N=35 in each). During baseline, researchers covertly measured either four or five customer service behaviors made by the cashers or sales associates, respectively. In the B condition, line graphs were publicly posted, by group, showing the percentage of time that each behavior was observed. These were updated three times each week. After a return to baseline, in the C condition, employees were given the package intervention. As part of that package, the performance matrix had tiered goals for each of the customer service behaviors, as well as a combined overall score based on weights given to reflect the importance of each behavior. In this condition, while the same graphs from the B condition were again publicly posted, they also included a goal that was based on a score for the overall performance matrix, as well as positive comments left by supervisors at least weekly. During the first week of the C condition, the graphs showed a subgoal, which was replaced by the terminal goal for the second and third weeks. During those three weeks, supervisors also held weekly team meetings during which they met with employees and gave feedback on each of the behaviors, as well as congratulations on goal attainment or improvements toward such. Supervisors also walked through the areas at least three times per day, immediately praising any instance of customer service behaviors they witnessed. Finally, if employees met the performance matrix goal for a consecutive two weeks, they were promised a celebration party.

The interventions were successful at increasing customer service behaviors, although results were comparable between the B and C conditions. In the A, B, A, and C conditions, cashiers had an average occurrence of 36%, 84%, 42%, and 83%, respectively, across all four behaviors. The sales associates saw similar increases, with the averages across both departments and all five behaviors being 7.5%, 54%, 14.5%, and 58%, respectively. The comparable performances between the B and C conditions were likely due to the fact that employees in all of the groups met all but one of the behavior terminal goals for the performance matrices during the feedback condition. And, as there was no additional reward for performing above those goals during the package intervention condition, performance likely plateaued as a result.

Abernathy (2001) performed the most extensive evaluation of scorecards to date, by retrospectively examining their effects, when paired with monetary incentive programs in twelve organizations. This included organizations in banking, retail, manufacturing, publishing, and distribution. In each, scorecards were given to employees and completed monthly. On those scorecards, employees received measure-specific and overall performance scores, as well as the amount of money they earned in incentives for that month. To perform the aggregate analysis, Abernathy created one index per organization by combining all of its scorecard measures. Then, Abernathy plotted the index from each organization for the first year of its implementation. Although results varied across organizations, the average improvement during that first year was 33.12%.

The studies carried out by Szabo et al. (2012), Eikenhout and Austin (2005), and Abernathy (2001) collectively lend support to the idea of using tiered goals in a business setting to improve the performance of employees. By using performance scorecards and matrices, all of which inherently leverage tiered goals, performances unequivocally improved across all three

studies. In addition to these aforementioned employee management programs, there also exists the use of similar programs aimed at increasing customer spending and loyalty. Examples like the M Life Rewards by MGM Resorts International ("M Life Rewards Benefits Chart," 2021) and the EDGE Program by EB Games ("EDGE Program Benefits Chart," 2021) both of which grant points to customers based on their patronage, ultimately allowing those customers to earn more desirable perks and benefits.

Lastly, Jeffrey et al. (2012), although it did not directly examine tiered goals, did provide support for their use. In that study, researchers randomly assigned performers to either a "one goal for all" condition, in which every performer had the same goal, or a performance-based goal condition, in which goal levels were based on the performance of that individual. Two pre-experimental sessions, in which performers were paid piece-rate pay, served to determine the performance level of each performer. They were then classified as either low, medium, or high performers. In the "one goal for all" condition, the goal was set so that 20% of the performers would meet it. In the performance-based goal condition, the goals were similarly set so that 20% of the performers would meet them, but the goals were specific to each sub-group (low, medium, or high performers). All of the performers then underwent three 35-minute sessions and, in addition to within- and post-session feedback, were also given a base pay with a bonus for meeting the goal they were assigned. In the "one goal for all" condition, performers received $5.00 if they met the goal. In the performance-based goal condition, they received either $3.50, $4.25, or $5.00 depending on whether they were in the low, medium, or high performer group.

Regardless of which condition they were in, the performances of high performers were comparable to one another. Low performers, on the other hand, did significantly better in the low-performance sub-group when compared to low performers in the "one goal for all"

condition. Additionally, when compared to their counterparts in the "one goal for all" group, more performers met their goal in the low- and medium-performance sub-groups. These results show that a performance-based goal benefitted low performers because they were more likely to meet the goal (and receive the bonus) when compared to those in the "one goal for all" condition. It is also worth noting that performers in both the low- and medium-performance sub-groups *decreased* their performances over the three sessions, something which aligns with the findings of Roose and Williams (2017) and suggests that the repeated lack of reinforcement over those sessions may have extinguished goal-directed behavior.

Unfortunately, the grouping of performers based on their performance level, as in Jeffrey et al. (2012), could not be used in business because of the disparity in pay between groups (which would violate wage laws at both the state and federal levels, not to mention that it would also likely be rejected by employees due to its unfairness). This grouping does, however, lend credence to the idea that tiered goals (which would provide performers with an easily attainable goal as well as consecutively more difficult goals) may result in better performance across all performers. Because low performers would be more likely to attain the easiest goal, their goal-directed behaviors would be more readily reinforced, ultimately making them more likely to continue engaging in those goal-directed behaviors in the future (and hopefully shaping their behavior enough for them become high performers). For high performers, the presence of the highest goal would continue to provide a challenging yet attainable goal that continues to reinforce their goal-directed behavior.

**Wage Pay**

The Bureau of Labor Statistics (2021b) defines productivity as a quantity of goods produced or services provided per hour worked. Since 1948, productivity in the U.S. has risen at

an average annual rate of 2.17%, whereas hourly compensation has risen at an average annual rate of 4.99% (Bureau of Labor Statistics, 2021a). This effectively means that, every year, organizations pay their employees more without receiving commensurate performance from those employees. At the heart of this are likely two factors: (a) where the productivity of workers is concerned, it is well-documented that paying workers a fixed wage results in underperformance when compared to monetary incentive pay (Bucklin & Dickinson, 2001) and (b) in the fourth quarter of 2020, the majority of Americans received salary or hourly wages (Bureau of Labor Statistics, 2021c). As such, this should be of great concern to organizations because their success relies both upon the performance of their individual employees (Lawler, 1990) and upon providing goods or services at a competitive cost, which can be difficult to achieve if productivity continually dwindles behind costs.

However, it is easy to understand why organizations continue to use wage pay with their employees, despite warnings to the contrary. From the viewpoint of an organization, wage pay is preferred due to its relative ease of designing, budgeting, and administering pay (Dierks & McNally, 1987; Frisch & Dickinson, 1990). Similarly, when compared to incentive systems, wage pay provides employees with a certain financial stability in that it guarantees a fixed amount of money for their labor. Where wage pay requires only that an organization track the hours worked by employees and the pay they receive for those hours, an incentive system is significantly more cumbersome. For an incentive system, the organization must first determine how to measure the performance of employees – and do this for each type of job, team, unit, or division within that organization. Then, the organization must determine how to calculate payout (both quantity and frequency) for meeting those performance measures. Furthermore, because it may not be feasible for an organization to create incentive systems for all of its job roles

(particularly where the measurement of performance may be hindered by the nature of the work), dividing the work force into those who do and do not receive incentive pay may be concerning to organizational leaders (Dickinson & Gillette, 1994).

## Incentive Systems and Goals

### *Piece-Rate Pay and Goals*

Although the majority of Americans receive wage pay, it has consistently been shown that incentive systems, where pay is contingent on performance, are more effective (Bonner et al., 2000; Bucklin & Dickinson, 2001; Condly et al., 2003; Garbers & Konradt, 2014; Jenkins et al., 1998; Stajkovic & Luthans, 2003). Reviews of both laboratory and field studies, performed by Jenkins et al. (1998) and Garbers and Konradt (2014), showed that incentive systems resulted in performance increases averaging an effect size of 0.34 and 0.32, respectively. When the analysis is restricted to business organizations, as in Stajkovic and Luthans (2003), the average effect size is even larger, at 0.68 (corresponding to a 23% improvement). It is worth noting that these authors also found performance increased substantially more when incentives were used alone than when social recognition or feedback were used alone. Moreover, when researchers used conservative measures to compare no-pay control groups to hourly pay groups, hourly pay did not result in better performances (Bonner et al., 2000). If liberal measures are used, hourly pay was better in only 33% of the studies.

Of particular note are piece-rate incentive systems, which have been shown to have very strong effects on performance (Dierks & McNally, 1987; Gaetani et al., 1985; LaMere et al., 1996; Lazear, 2000). For example, in a study conducted by Gaetani et al. (1985), two machine shop workers received a weekly 5% commission when the number of dollars they charged customers exceeded a standard. When compared to baseline, the number of dollars billed by

those workers increased, on average, by more than 190% after the implementation of the commission – without any adverse impact on quality.

In another study, conducted by Lazear (2000) in a large glass manufacturing organization, a piece-rate pay system was implemented for nearly 3,000 workers. After the introduction of that piece-rate pay system and throughout the 19-month duration of the study, productivity increased by 44% – and quality, customer satisfaction, and company profitability all increased, as well.

In one of the longest field studies, LaMere et al. (1996) worked with a waste disposal organization to implement a piece-rate pay system for 22 of their truck drivers. When truck drivers were able to earn incentives in the form of 3% of their total wages, they immediately increased their performance by about 20% from baseline. Interestingly, when the incentive was increased to 6% and 9%, performance did not increase beyond the original 3%. Regardless, performance increases maintained for nearly four years, until the researchers ceased data collection. Over these four years, the organization saved an average of $5,000 per month in labor, despite an increase in pay for the drivers. It should also be noted that this increase in performance had no impact on safety as it was equivalent during both baseline and intervention.

LaMere et al. (1996) shows that piece-rate pay systems can be effective if they take the form of only a portion of an employee's pay, rather than all of it, being contingent on performance. Frisch and Dickinson (1990) also found an increase in performance with incentives being only 10% of performer base pay. Finally, Dickinson and Gillette (1994) found that the effects are comparable whether performers are paid only a portion in incentives or they are paid entirely in incentives. This fact may assuage any concerns regarding financial security, as workers would be guaranteed at least a base wage with the former (Aamodt, 2016).

There were also three initial studies that examined the effects hourly pay, goals, and piece-rate pay had on performance (Chung & Vickery, 1976; Pritchard & Curtis, 1973; Terborg & Miller, 1978). Terborg and Miller (1978) found that participants assembled significantly more toy models when piece-rate pay was combined with goals, compared to either hourly pay, hourly pay with goals, or piece-rate pay alone. Based on a regression analysis, they also showed that goals and piece-rate pay had independent and compounding performance effects. Chung and Vickery (1976) and Pritchard and Curtis (1973) showed similar results in their studies, finding that performance could be expected to increase with both goals and piece-rate pay when compared to hourly pay.

Ramos (2020) found similar effects with tiered goals and piece-rate pay. The study used 104 undergraduates participating in five 45-minute experimental sessions, during which they engaged in a simulated medical data record entry task. Prior to the experimental session, all participants underwent a 45-minute pre-experimental session (during which they were paid piece-rate pay) to serve as the covariate. Feedback was provided in the form of in-session feedback, displayed by the program, if participants chose to view it, and as receipts given to the participants by the researcher prior to the start of the session (which showed number of correctly completed records for the previous session, as well as pay earned). Participants were randomly assigned to one of the four following conditions: hourly pay without tiered goals, hourly pay with tiered goals, piece-rate pay without tiered goals, or piece-rate pay with tiered goals. The receipts for the participants in the two tiered goals groups also displayed the five tiered goals, which corresponded to the $10^{th}$, $30^{th}$, $50^{th}$, $70^{th}$, and $90^{th}$ percentiles of performance.

The adjusted group averages showed unequivocally that the piece-rate pay with tiered goals group correctly completed significantly more medical records than the other three groups.

The analysis also showed that the hourly pay with tiered goals group significantly outperformed the hourly pay without tiered goals group. Thus, these findings align with those of the three earlier studies in indicating that goals and piece-rate pay have independent and compounding performance effects.

***Bonus Pay and Goals***

While bonuses are common incentives in organizations, their characteristics can vary. Namely, bonuses may vary in whether they are contingent on performance (as opposed to, for example, a holiday bonus); whether they are contingent on the individual's performance, as opposed to a group's or the organization's (e.g., profit sharing); and the frequency at which the bonus is paid (e.g., quarterly or yearly). Unfortunately, because of these variations in "bonus" types, the exact proportion of employees receiving individualized bonus incentives is not clear. Furthermore, neither are the performance standards and other details of those incentive systems.

What is clear from the research, however, is that performance-contingent bonuses and goals have interactive effects on performance (Lee et al., 1997; Mowen et al., 1981). Mowen et al. (1981) used a 2 x 3 between-group design to compare the effects of types of incentive systems and goal difficulty levels. The incentive systems were piece-rate pay and base pay plus a bonus that was contingent upon goal attainment. The goal levels were based on a pilot study and set as follows: very easy (100% of participants expected to reach it), moderate (50% expected to reach it); very difficult (0% expected to reach it). One hundred and twenty-four undergraduates were randomly assigned to one of the six conditions and were paid with poker chips for completing arithmetic problems (adding columns of four six-digit numbers). The poker chips could later be exchanged for small office supplies. The piece-rate pay groups were given one poker chip for each correctly completed arithmetic problem, regardless of whether they attained their assigned

goal. The bonus pay groups received 15 chips as their base, with an additional 15 for the participants in the "very easy" goal group if they met their goal, 40 for the "moderate" goal group, and 90 for the "very difficult" goal group. To ensure equality between the piece-rate and bonus groups, participants in the bonus groups also earned piece-rate for any correctly completed problems above their goal. Finally, participants were also given a posttest to determine whether office supplies were a desirable form of payment, as well as to ensure that participants understood their pay system and whether they thought they could reach their assigned goal.

The authors used the participants' perceived ability to reach their assigned goal, as well as their actual ability and accuracy (both measured during a five-minute practice session) as the covariates to control for any pre-existing differences between participants. The analyses showed that under the "very easy" and "moderate" goal conditions, the bonus groups outperformed the piece-rate pay groups. However, the piece-rate pay with the "very difficult" goal group correctly completed the most arithmetic problems out of all the conditions. Perhaps unsurprisingly, of the three bonus pay groups, the "very difficult" goal group performed the worst. This is consistent with the argument made by Daniels (2009) that, "… the best mistake in setting a goal is to set it too low" (p. 41). However, it should be noted that the "very difficult" goal in this study went beyond even a stretch goal (0% of participants were expected to reach it), which goes against the suggestion that a goal should be difficult yet achievable (Lee et al., 1997; Locke & Latham, 2007).

Miller and Steele (1984) attempted to replicate the study by Mowen et al. (1981) but found no interaction effect. Lee et al. (1997), in their extension of Mowen et al. noted that this was likely due to Miller and Steele not providing subjects with performance feedback, whereas Mowen et al. did. So, Lee et al. extended the original study, this time using a 3 x 3 between-

groups design, providing feedback on performance, and paying participants $9 on average. In their study, the pay systems were hourly wage, piece-rate pay, and bonus pay; and the goal difficulties, again based on a pilot study, were set at 90%, 50%, and 10%. The dependent variable was the same as the original but divided into two trials. Additionally, only the practice session performance was used as a covariate (as opposed to the posttest measures that were also used in the original).

With 102 undergraduates, Lee et al. (1997) first had participants undergo a 5-minute practice session before assigning them their goal. Then participants performed the task for ten minutes, after which they graded themselves using answers provided by the researcher. Following this, participants were then assigned a higher goal (that corresponded to the same percentiles, but accounted for learning effects, again based on data from the pilot study) before performing the task for another 10 minutes. In both trials, the analysis showed that the group receiving bonus pay and the "very easy" goal correctly completed the fewest problems of all six groups. Of all the three bonus groups, however, the "moderate" goal group was the highest performing. When the authors examined the 2 ("moderate" and "very difficult" goals) x 2 (piece-rate pay and bonus pay), they found similar results as Mowen et al. (1981) with respect to performance.

**Tiered Goals and Incentive Systems**

Locke (2004) posited that a tiered goal system would likely result in different levels of performance than would a single goal, particularly when investigating incentive systems. He reasoned that the effectiveness of tiered goals would likely result from performers still being rewarded, even if they just miss a high-level goal. Sundberg (2015) and Urschel (2015) agreed, reasoning from a behavioral perspective that tiered goals would ensure that performers receive

reinforcement at various levels of performance. This, in turn, would make it so that even employees who cannot reach the highest goal will still have their goal-directed behavior reinforced for reaching a lower-level goal. As a result of this, the reinforcement for meeting those lower-level goals would likely then evoke higher levels of performance, perhaps to the point of reaching the highest goal (Bateman & Ludwig, 2003; Daniels & Bailey, 2014).

With this reasoning in mind, Urschel (2015) examined three types of goals (moderate, difficult, and tiered) under a base pay with bonuses incentive system. There were three tiered goals, determined by previous research to be low, moderate, and difficult. In this study, 44 undergraduate students engaged in a simulated medical record data entry task for six 45-minute sessions, throughout which they received printed receipts of their performance in the previous session that included both a text form and a graphic form of their performance, as well as their assigned goal(s). The first session was used as a covariate in the analyses, with participants being paid straight base pay (no bonus). Analyses were conducted on the second and sixth sessions due to the experimenter's interest in the initial and terminal effects of the goals. Unfortunately, Urschel found significant ceiling effects regardless of the goal type, which was determined to be the result of the goals being too easy to attain. As such, no significant differences between goal types were found.

Sundberg (2015) continued with this line of research by examining the effects of four pay systems. In this study, all participants were given five tiered goals, determined from previous research. The first, third, and fifth of these goals were intended to align with those of Lee et al. (1997). Specifically, these goals were meant to be set such that 90%, 50%, and 10% of performers would reach them. Sixty-six undergraduate students engaged in the same medical record data entry task as in Urschel (2015), but this time for only five 45-minute sessions

(however, the experimenters discarded the data from the last session due to abnormalities). Like Urschel, participants also received graphic feedback on their previous session prior to the start of a session. However, Sundberg also included vocal feedback before the sessions, as well as computer-delivered feedback during the sessions. It should be noted that the vocal feedback was purely objective in that researchers did not comment on performance, as it may have served as a form of evaluative social reinforcement and consequently may have affected performance (Derthick, 2018; Johnson, 2013).

The four pay systems were fixed pay, piece-rate pay, threshold piece-rate pay, and bonus pay. In all but the fixed pay condition, participants earned a base pay with incentives based upon on the number of correctly completed medical records. The threshold piece-rate pay condition bears explanation in that it was similar to the piece-rate pay condition, but the per-piece incentive increased as participants met higher goals (whereas the per-piece incentive was constant in the piece-rate pay condition). In the bonus pay condition, the amount of the bonus increased only when participants met the next, higher goal.

Unfortunately, Sundberg (2015) again found no significant differences on the number of correctly completed medical records between the groups. Because of this, it could be the case that fixed pay with tiered goals may result in similar performance as incentive pay with tiered goals. If so, this would be contrary to the results of earlier research, which found separate and additive effects caused by goals and piece-rate pay (Chung & Vickery, 1976; Pritchard & Curtis, 1973; Terborg & Miller, 1978). However, the lack of statistically significant differences in Sundberg (2015) were determined to be due to sample sizes that were likely too small (as indicated by very high within-group variability across all groups) and tiered goals that were set too high (as indicated by a substantially smaller number of participants reaching each goal than

was expected). Additionally, Sundberg noted that participants in the piece-rate pay group performed highest of the four groups, although again not to a statistically significant level. Thus, further research was warranted.

Ramos (2020), detailed previously, extended this line of research by examining fixed pay and piece-rate pay conditions both with either no tiered goals or five tiered goals (which were based on earlier research by Einarsson, 2016). The experimenters posited that the piece-rate pay with tiered goals group would be the highest performing group, the fixed pay without tiered goals group would be the lowest performing, and the fixed pay with tiered goals and piece-rate pay without tiered goals groups would fall in the middle (because earlier research had not led the experimenters to insight on which of these two groups would outperform the other). A rank-based monotone ANCOVA showed this ranking to be the case, and a comparison of the percentiles of actual to expected performance (for the tiered goals) showed no discrepancy greater than 6%. What is interesting, however, is an additional 2 x 2 ANCOVA with subsequent Fisher-Hayter comparison tests run the by the experimenters, which showed that indeed there was no statistically significant difference between the fixed pay with tiered goals group and piece-rate pay without tiered goals group. In other words, tiered goals, when added to fixed pay, may result in performance increases similar to that of piece-rate pay alone.

**Summary and Rationale**

The current study sought to extend the line of research on tiered goals, this time by examining the effects of three types of pay systems (fixed pay, piece-rate pay, and bonus pay) when performers were given the same five tiered goals. Based on the findings by Sundberg (2015), we suspected that the piece-rate pay group would perform the highest. Earlier research, including that of Ramos (2020), suggested that the fixed pay group would perform the worst.

Because the current study was an extension of Ramos (2020), the experimental procedures were similar. However, because of the effects of COVID-19, the experimental task was performed remotely by participants rather than in a lab setting. As such, it was likely that the actual number of participants who attained each of the tiered goals would differ and thus affect the results. So, as a precaution, the experimenter compared early participant data from the covariate session of this study to that from Ramos (2020). No significant disparities were witnessed in these early stages, and so data collection continued as planned.

The performance of participants while working remotely was of particular interest in this study as well. According to the Bureau of Labor Statistics (2020), "… 24 percent of employed persons did some or all of their work at home…" With the recent pandemic forcing many office workers to work from home, these numbers have likely grown significantly. This means that a large proportion of the population may find it challenging to keep their home life from interrupting their work (Kniffin et al., 2021). Additionally, a Gartner (2020) survey showed that, when compared to employees who never work remotely, those who do are more likely to exhibit high discretionary effort. Contrarily, other survey data show that remote workers typically find, "… the working day is longer, the intensity of each hour worked is higher and more voluntary effort is expended" (Felstead & Henseke, 2017, p. 205).

Because of the ambiguous nature of the findings around remote work, it was hoped that this study would add empirical evidence to the literature on the performance of remote workers compared to their non-remote peers. This was done by comparing the performance of participants in the fixed pay and piece-rate pay groups with those of Ramos (2020), which used the same experimental methods but in a laboratory environment. Furthermore, it was hoped that this study would contribute to the literature on tiered goals, perhaps shedding light on whether

they are best used with piece-rate pay or with bonus pay. It was thought that piece-rate pay would result in significantly higher performance, but a finding to the contrary could be beneficial knowledge for organizations, as a bonus pay system is typically easier to implement and oversee than that of a piece-rate pay system.

# METHOD

## Participants

Prior to recruiting participants, the approval of Western Michigan University's (WMU) Human Subjects Internal Review Board (HSIRB) was sought with respect to conducting the current study. The approval letter is provided in Appendix A. The recruitment script and presentation used to recruit undergraduate students can be found in Appendix B. Due to the limitations imposed by the Coronavirus Disease 2019 (COVID-19), students were recruited in one of three ways: (a) in person, where the researcher read the recruitment script to a classroom of students at the start of the class period; (b) online by the instructor, who posted the recruitment presentation to the class website; and (c) online by e-mail communication, through which a condensed version of the recruitment script was sent to groups of students.

Ninety undergraduate students enrolled at WMU were recruited to participate in the study, although only 71 of those 90 completed the study. Potential participants who communicated with the researcher were contacted via e-mail with the consent form, which provides details of the research study (Appendix C). If students elected to participate, they filled out a Qualtrics survey containing the consent statement and a short questionnaire to determine if they were indeed eligible to participate in the study (Appendix D).

Students were eligible to participate in the research study if they met the following criteria: (a) must not have participated in previous studies which used the same experimental task; (b) must not have taken or be currently enrolled in PSY 3440 (Organizational Psychology), PSY 2444 (Organizational Psychology), or PSY 3444 (Advanced OBM); (c) could meet the time requirements for the study of six 45-minute sessions during the semester in which they began the study, and within six weeks of beginning the study; and (d) had a computer available, on which

they had installed Microsoft Excel (downloadable for free using their university account) and Loom, a free video- and screen-recording software available through Google. This latter requirement restricted participants to those with a computer with either Windows or Macintosh operating systems, as other operating systems would not function with the Excel-based experimental task.

Lastly, for their participation in the study, participants were able to earn extra credit towards one of their classes, provided that the instructor allowed for that. Additionally, participants were told they would be likely to earn, on average, $9.30 per 45-minute session, or approximately $55.80 for the whole study. Due to the limitations imposed as a result of COVID-19, participants could elect to be paid in cash or via Venmo, a secure mobile payment service owned by PayPal, through which the researcher sent the participant their earnings.

**Setting**

Because of the impacts of COVID-19 and the recent rise of remote work environments, all meetings and sessions occurred online. For the initial meeting, prospective participants scheduled an online meeting with the researcher via e-mail. That first meeting, held virtually over WebEx (software provided free for students by the university), served to orient and train participants to the requirements of the study. However, after this first meeting and until the debriefing meeting, all interactions between participant and researcher occurred via e-mail (unless the participant explicitly asked for a one-on-one meeting). Twenty-four hours prior to each of the participants' scheduled sessions, the researcher e-mailed participants the task and their pay and performance receipt for the previous session (beginning with the second session).

Any questions that participants had before their session could be e-mailed to the researcher, who responded within 24 hours. During the session, participants were required to

have Loom (a free video messaging software application) installed and running on their computer. For the duration of the session, participants and their computer screens were recorded by Loom. Once the session was over, participants closed out of Loom, which then provided them with a weblink that they then sent to the researcher, allowing the researcher to view the session. Participants were also required to set aside the time for the session, ensuring that they could be in front of their computer for the full 45 minutes, without another person present in the room (or at least be isolated, if they were in a public space such as a library).

To more realistically simulate a work environment in which a manager typically has numerous employees, participants were told that their Loom recording may or may not be viewed but was a requirement of their participation. However, when oddities were found with their data, the video for that session was viewed. Participants who failed to record their first, second, or third session – or otherwise provide that recording to the researcher – were removed from the study. This was not the case if they failed to provide the recording of any of their last three sessions, however, unless it occurred more than once. The researcher reviewed, on average and at random, one recording for every five submitted. The researcher also watched a recording if the corresponding data were outside of the expected or average for participants.

**Apparatus**

Participants engaged in a simulated medical record data entry task which was hosted within a macro-enabled Excel spreadsheet. A screenshot of the task window is available in Appendix E. For the duration of their 45-minute sessions, participants had to manually enter the provided patient ID into the textbox and then determine whether the patient's heart rate was within or out of range based on the given heart rate, the sex of the patient, and the corresponding range provided. Once they made that determination, they selected the appropriate radio button

and clicked the submit button. Upon clicking the submit button, the program tallied the response as correct or incorrect and then repopulated the window with new, randomized information for the next patient. During their sessions, participants were able to show or hide a progress window which displayed the total number of records entered, the total number correct, and the time remaining for the session. After 45 minutes had elapsed, the program automatically terminated.

Because participants were using their own computers for sessions, they had access to whatever programs and applications were loaded on their computer, as well as their cell phones and internet, but were not permitted to open another Excel file on the computer during their session. If they were to do so, there was a risk that it could crash the program and their data would be lost. Participants were permitted to engage in other activities during their session (so long as they do not exit the Excel window which contains the program) because, otherwise, they might have engaged in the experimental task as a result of having nothing else to do. This could, in turn, have masked the effects of the independent variable. Participants were told, however, that they would not be monitored during sessions and that their recordings may or may not be reviewed, except in the case of data irregularities which would guarantee a review.

**Dependent Variables**

The primary dependent variable for this study was the average number of medical records completed correctly per session by participants. There were three secondary dependent variables for the sessions: (a) time on task, defined as the average number of minutes per session that participants spent performing the experimental task; (b) accuracy, defined as the average percentage of correctly entered medical records per session; and (c) data entry rate, defined as the average number of correct medical records divided by time on task per session. The program automatically tracked time off task, defined as any pause in responding greater than 30 seconds.

From this, time on task was calculated by subtracting the total time off task from the 45 minutes that were the length of the session. Finally, two tertiary dependent variables were measured, which were: (a) the number of times that participants clicked to show their progress and (b) the amount of time that the progress window was open during the session.

After 45 minutes had elapsed and the program terminated, the participant was prompted to save the file in a location on their computer that was easily found. The program's "save as" prompt automatically filled in the participant's number and session number as the file name. Once they had saved the file, the program reminded the participant to e-mail that saved file to the researcher. The researcher was then able to unlock the file to retrieve the corresponding data for that session. From these data, the researcher was then able to calculate the averages per session for all of the dependent variables. E-mails from participants with these files were stored in the experimenter's e-mail archives and any downloaded files were stored on a password-protected computer.

Lastly, at the end of the study, participants were given a questionnaire to assess how stressful they found the goals and their pay system to be, as well as how satisfied they were with the pay system. These self-report measures were used to determine if any differences existed between the three pay systems with respect to stress and satisfaction.

**Independent Variables**

The independent variable for this study was the type of pay system to which participants were exposed: fixed pay, base pay with bonuses, or piece-rate pay. All participants had five tiered goals present throughout the experiment, regardless of the condition to which they belonged.

### *Tiered Goals*

The tiered goals were explained to participants prior to their second session and were constant and available for every session thereafter. These goals were based on previous experimentation conducted by Ramos (2020) and corresponded approximately to the 10th, 30th, 50th, 70th, and 90th percentiles of performance for 104 participants. Respectively, they were set at 190, 250, 310, 360, and 410 correctly completed records per session.

### *Pay Systems*

Participants receiving fixed pay earned $9.30 per session, regardless of their performance with the experimental task. Participants in the base pay with bonuses condition earned $4.80 as their base pay (regardless of performance), with an additional $1.50 given for each successive goal attainment, up to $7.50 for attaining the highest goal (resulting in a total of $12.30). In the piece-rate pay condition, participants earned three cents per correctly completed record. If participants in the base pay with bonuses and piece-rate pay conditions performed at average levels (i.e., if they correctly completed 310 medical records), they earned the same amount of money as those in the fixed pay condition (i.e., $9.30 per session). Average performance was also determined from Ramos (2020), whose participants performed the same task and earned either fixed pay or piece-rate pay. Data from Sundberg (2015) were not used to determine average performance because his participants performed unusually well, as indicated by data from three subsequent studies (Einarsson, 2016, 2018; and Ramos, 2020). It is worth noting that, while average performances resulted in equal pay for participants regardless of the condition, it was possible for participants in the piece-rate pay condition to earn more than participants from the other conditions. For example, if the highest session performance from Ramos (2020) were to have occurred in this study, that individual would have received $17.19 for that single session.

Participants in the current study received e-mails prior to each session, beginning with the second session, that included the following: the number of correctly completed records during the previous session, the amount of pay received for that previous session, the total amount earned up to that point, and the five tiered goals. Participants did not receive the pay, however, until the end of the experiment when they were debriefed.

**Experimental Design**

An ordered treatments design with three conditions was employed for the current study. Those three conditions, as described earlier, were fixed pay, base pay with bonuses, and piece-rate pay. All three conditions had the same five tiered goals present throughout the study. Participants underwent a total of six 45-minute sessions. The first session, however, was a pre-experimental session that was used to determine participants' keyboard proficiency. Performance during this session served as a covariate for the statistical analysis.

**Statistical Analyses**

Because the current study used an ordered treatments design, the rank-based analysis of covariance (ANCOVA) monotone method, described by Huitema (2011, p. 360), was used to analyze the data. This method determined whether an increasing, monotonic trend existed between the three conditions with respect to the average number of correctly completed medical records per session. It was hypothesized that this ordering would take the form of the fixed pay condition being the lowest performing and the piece-rate pay condition being highest, with the base pay with bonuses condition being in the middle. To perform this analysis, conditions were ranked according to this order, and the performances of participants during the covariate session and for each experimental session thereafter were ranked, as well. As indicated earlier,

differences in keyboard proficiency were controlled for by using performance during the pre-experimental (first) session as the covariate in this analysis.

ANCOVAs were also used on the three secondary dependent variables (time on task, accuracy, and data entry rate), as well as the two tertiary dependent variables (number of clicks to see progress and amount of time that the progress window was open), to determine if differences existed between the three conditions. In addition to these, Pearson product-moment correlations were conducted between all combinations of the first four dependent variables (the primary and three secondary) in order to determine the strength of the relationship between them. Furthermore, a comparison of the expected goal attainment (i.e., the goal percentiles based on Ramos, 2020) and the actual goal attainment (i.e., the percentiles from the current study) was conducted to determine if any differences existed.

Lastly, an analysis of variance (ANOVA) was conducted between the three conditions with respect to the amount of money earned by participants, as well as with respect to the responses provided on a stress and satisfaction questionnaire given to participants at the end of the study.

## Experimental Procedures

### *Introductory Session*

Prior to the initial meeting, the researcher e-mailed the participant the consent form and a version of the experimental task, which was used for training the participant, both as attachments to the text indicated in Introductory Session Script (Appendix F). The researcher also sent the participant a meeting invitation for an agreed-upon time for the online introductory meeting, which took place over WebEx (software provided free for students by the university). During that meeting, the researcher ensured that the participant filled out the consent questionnaire and

verified that the participant was indeed eligible to participate. If they were eligible, the researcher then assigned the participant their participant number using a list of random numbers. Then, the researcher introduced the participant to the experimental task using the Introductory Session Script. Once the participant was familiar with the experimental task, the researcher then had the participant download, install, and test their ability to have Zoom recording on their computer.

***Pre-Experimental (Covariate) Session***

Twenty-four hours prior to the first (pre-experimental) session for participants, the researcher e-mailed the Excel file with the experimental task, as well as instructions which are detailed in Appendix G. For this session, all participants, regardless of condition, were paid piece-rate pay. These incentives were intended to ensure that participants did their best for the purposes of determining their keyboard proficiency. Comparing the data from Einarsson (2016) to data from Einarsson (2018) and Ramos (2020), it was seen that participants performed best when paid piece-rate during this session than when they were paid a fixed amount. Additionally, the performance of low performers is artificially suppressed when they are first paid fixed pay and later piece-rate pay (Einarsson, 2018). This effect was not found when participants were paid piece-rate pay during their pre-experimental session (Ramos, 2020). Thus, to ensure that performance was not negatively impacted, participants were paid piece-rate during the pre-experimental session in the current study.

Once participants completed the 45 minutes, the program terminated, prompted them to save the file, and reminded them to e-mail the file as well as the Loom recording weblink to the researcher.

### *Experimental Sessions*

Twenty-four hours after receiving the participant's items from their first session, the researcher e-mailed the participant the Pay Quiz (Appendix H). The participant had to respond and score 100% on the quiz before they could begin their second (first experimental) session. If the participant did not score 100% on the quiz, the researcher provided feedback on the missed items and sent the participant a second version of the pay quiz (Appendix I).

Once the participant had scored 100% on the pay quiz and 24 hours in advance of their scheduled session, the researcher sent them the items for their first experimental session (Appendix J). Each experimental session thereafter followed the same procedures, requiring that the participant had sent their items to the researcher before the researcher then sent the e-mail for the next session. Within each of these e-mails was a pay and performance receipt, which listed the number of correctly completed records during the previous session, the pay received for that session, the total pay received for the study thus far, and the five tiered goals (which served as a reminder to the participant).

For all five of the experimental sessions, the researcher did not comment on participants' performance, he only provided the data relevant to the receipt. Johnson (2013) found that praise and criticism could influence performance and thus impact the effects of the pay systems. Thus, the instructional scripts indicated that no comments on performance are to be provided to participants for fear of inadvertently providing evaluative feedback.

## Debriefing

After participants had finished their final session, they scheduled a debriefing meeting with the researcher. That meeting again took place over WebEx, for which the researcher provided the participant with a weblink via e-mail. At least 48 hours prior to that meeting, the

researcher also sent the final pay and performance receipt for the participant and a link to a Qualtrics survey containing the Stress and Satisfaction Questionnaire (Appendix K), as well as instructions to complete that questionnaire prior to the meeting (see Appendix L for the debriefing script). During the meeting, the researcher verified that the participant completed the questionnaire, determined how the participant wished to be paid (in cash or via Venmo), and then described the purpose of the study, offered to answer any questions, and thanked them for their participation in the study. If the participant elected to be paid in cash, the researcher scheduled a time to meet with the participant on WMU's campus. If the participant elected Venmo, then the researcher obtained the participant's information and completed the transfer during the WebEx meeting.

**Integrity of the Independent Variable**

All interactions between the researcher and participants were scripted in order to ensure consistency among participants. Every day, the researcher downloaded completed sessions submitted by participants and copy-pasted the relevant information into an Excel spreadsheet which contained the data for every participant (coded using only participant numbers, not using any identifying information). This spreadsheet was backed up daily to a password-protected flash drive, as well. To reduce the chance of making an error, payout values for participants were calculated using that same spreadsheet. Additionally, the researcher reviewed, at random, one of every five submitted Loom recordings, as well as recordings corresponding to any file submission which was outside of expected or average performance. Each day, after having downloaded and reviewed the data, the researcher drafted and sent the relevant e-mails containing the receipts, instructions, quizzes, WebEx weblinks, etc., as needed, for the upcoming participant sessions.

# RESULTS

## Primary Analyses

The means and standard deviations for the average number of correctly completed records (the primary dependent variable) can be found in Table 1 below. These data are shown for the three groups during the covariate and the average of the five experimental sessions. Table 2 displays the adjusted means for the average of the experimental sessions for each group.

**Table 1**

*Means and Standard Deviations for Correctly Completed Records*

| | | Sessions | | | |
|---|---|---|---|---|---|
| | | Covariate | | Experimental | |
| Condition | *n* | Mean | *SD* | Mean | *SD* |
| Fixed pay | 25 | 239.8 | 80.6 | 258.1 | 87.5 |
| Bonus pay | 24 | 267.2 | 59.1 | 320.2 | 62.5 |
| Piece-rate pay | 22 | 252.5 | 60.9 | 297.5 | 65.5 |
| Overall | 71 | 253.0 | 68.0 | 291.3 | 76.7 |

**Table 2**

*Adjusted Means for Correctly Completed Records*

| Condition | Adjusted Mean |
|---|---|
| Fixed pay | 270.2 |
| Bonus pay | 307.2 |
| Piece-rate pay | 297.9 |
| Overall | 291.3 |

Before a rank-based ANCOVA monotone analysis can be carried out, homogeneity of the regression slopes for each group must be present. The analysis for homogeneity indicated that the group slopes were indeed homogeneous ($F = 0.013$, $F_{CV(0.05,2,65)} = 3.13$). As such, the rank-based ANCOVA monotone analysis (Huitema, 2011) was carried out, the source table for which can be found in Table 3 below. The analysis failed to confirm the hypothesized relationship between the three groups ($F = 2.31$, $p = 0.133$). There are two possible reasons for this: (a) there

were no significant differences between all or some of the groups, or (b) differences exist, but the ordering of the groups was not as hypothesized. It was hypothesized that the fixed pay group would perform the worst, followed by the bonus pay group, and the piece-rate pay group would perform the best. Thus, it is possible, for example, that the bonus pay group outperformed the piece-rate group.

**Table 3**

*Source Table for Rank-Based ANCOVA Monotone Analysis*

| Source | *df* | *SS* | *MS* | *F* | *p* |
|---|---|---|---|---|---|
| Covariate | 1 | 19761 | 19761 | 145.11 | 0.000 |
| Experimental Conditions | 1 | 314.3 | 314.3 | 2.31 | 0.133 |
| Error | 68 | 9260 | 136.2 | | |
| Total | 70 | 29819 | | | |

Because there was no statistically significant finding for the hypothesized rank-based ordering of the three groups in this study, a traditional one-factor ANCOVA was used to determine whether differences existed between the groups, perhaps in an ordering contrary to that proposed. Table 4 displays the source table for the one-factor ANCOVA used to make that determination. This ANCOVA resulted in a statistically significant difference between the groups ($F = 5.94$, $p = 0.004$).

**Table 4**

*Source Table for One-Factor Analysis of Covariance on Correctly Completed Records*

| Source | *df* | *SS* | *MS* | *F* | *p* |
|---|---|---|---|---|---|
| Covariate | 1 | 263737 | 263737 | 177.28 | 0.000 |
| Experimental Conditions | 2 | 17663 | 8832 | 5.94 | 0.004 |
| Error | 67 | 99676 | 1488 | | |
| Total | 70 | 411821 | | | |

However, by nature of a statistically significant result from an ANCOVA, it is unknown which group or groups are different. Thus, Fisher-Hayter tests were performed on the each of the

three two-group permutations. The adjusted means for the fixed pay, bonus pay, and piece-rate pay groups were 270.2, 307.2, and 297.9, respectively. Using the Fisher-Hayter tests, it was found that a difference between the fixed pay and bonus pay groups (adjusted mean difference of 37.0) was statistically significant ($q = 4.68$, $p = 0.002$). The difference between the fixed pay and piece-rate pay groups (adjusted mean difference of 27.7) was also statistically significant ($q = 3.46$, $p = 0.017$). The difference between the bonus pay and piece-rate pay groups (adjusted mean difference of 9.3), however, was not significant ($q = 1.15$, $p = 0.419$). This non-significant comparison explains the non-significant finding from the rank-based ANCOVA monotone method: Because there was no statistically significant difference between the bonus pay and piece-rate pay groups, this violated the assumption of monotonicity for the original analysis.

Although it is statistically irrelevant due to the faults that lie with performing an unplanned analysis, it is worth noting that altering the hypothesized ordering does indeed result in a statistically significant finding. If, instead, we rank order the groups as (a) fixed pay, (b) piece-rate pay, and (c) bonus pay, the resulting rank-based ANCOVA monotone analysis indicates that a monotonic relationship *does* exist ($F = 7.64$, $p = 0.007$). This implies that, between the bonus pay and piece-rate pay groups, a difference exists which was not sufficiently large for the Fisher-Hayter test to detect, yet is detectable by the rank-based ANCOVA monotone method in this ordering. The disparity here is due in part to the conservative nature of the Fisher-Hayter test (to avoid multiplicity), which is a two-tailed test, and in part to the power of the rank-based ANCOVA monotone method, which is a one-tailed test. Regardless, because this ordering was not originally hypothesized, its statistical significance cannot be considered a valid result of this research.

**Secondary Analyses**

Because the primary dependent variable might have been impacted by the secondary dependent variables, the means and standard deviations were calculated on the average of the five experimental sessions for time on task, data entry rate, and accuracy. These are provided in Table 5. ANCOVAs were conducted on the three secondary dependent variables, as well. A statistically significant difference was found with time on task ($F = 3.44$, $p = 0.038$) and with data entry rate ($F = 3.27$, $p = 0.044$), indicating a difference existed between the pay systems. For the time on task, Fisher-Hayter tests determined that no significant difference existed between the bonus pay and piece-rate pay groups but did exist between the fixed pay group and bonus pay group ($q = 3.46$, $p = 0.017$), as well as between the fixed pay group and piece-rate pay group ($q = 2.92$, $p = 0.043$). For the data entry rate, Fisher-Hayter tests revealed that only the difference between the fixed pay group and bonus pay groups was statistically significant ($q = 3.62$, $p = 0.013$).

**Table 5**

*Means and Standard Deviations for Accuracy, Data Entry Rate, and Time on Task*

| | | Time on Task | | Data Entry Rate | | Accuracy | |
|---|---|---|---|---|---|---|---|
| Condition | *n* | Mean | *SD* | Mean | *SD* | Mean | *SD* |
| Fixed pay | 25 | 39.92 | 6.88 | 6.46 | 1.32 | 97.32% | 1.34% |
| Bonus pay | 24 | 43.95 | 1.99 | 7.26 | 1.28 | 97.95% | 1.04% |
| Piece-rate pay | 22 | 43.92 | 1.88 | 6.75 | 1.355 | 97.41% | 1.23% |

Additionally, Pearson product-moment correlations were calculated between the primary dependent variable and the three secondary dependent variables. The results of these correlations can be found in Table 6. The number of correctly completed records was significantly positively correlated with all three secondary dependent variables, which indicates that they each had an effect on the number of correct records completed by participants. It is also evident from the

table that the three secondary dependent variables were significantly (positively) correlated with one another.

**Table 6**

*Correlations between the Primary and Secondary Dependent Variables*

| Dependent Variable | Time on Task | Rate | Accuracy |
|---|---|---|---|
| Correctly completed medical records | 0.733** | 0.910** | 0.450** |
| Time on Task | | 0.419** | 0.509** |
| Rate | | | 0.317* |

*$p < 0.01$. **$p < 0.001$.

**Tertiary Analyses**

An ANCOVA was conducted on the number of times participants clicked to show the progress window per session, as well as on the amount of time (in minutes) the progress window was visible per session. In both cases, no significant difference was found between the groups ($F = 0.22$, $p = 0.639$ and $F = 2.78$, $p = 0.100$, respectively). Table 7 shows the means and standard deviations for both variables.

**Table 7**

*Means and Standard Deviations for Number of Clicks and Amount of Time for Progress*

| | | Number of Clicks | | Amount of Time | |
|---|---|---|---|---|---|
| Condition | *n* | Mean | *SD* | Mean | *SD* |
| Fixed pay | 25 | 2.6 | 2.54 | 18.8 | 19.88 |
| Bonus pay | 24 | 3.1 | 3.41 | 15.0 | 16.02 |
| Piece-rate pay | 22 | 2.6 | 3.46 | 14.5 | 15.95 |

**Accuracy of the Percentiles for the Tiered Goals**

Table 8 shows the comparison of the percentiles between actual performance and expected performance (taken from Ramos, 2020). The percentiles were determined by averaging each participant's number of correctly completed records from the five experimental sessions and ranking those averages. It can be seen that, for the three lower percentiles, performance was

within ±12 correctly completed records. However, for the two highest goals (70th and 90th percentiles), performance was markedly lower in the current study (27 and 33 correct records per session, respectively. These large discrepancies indicate that perhaps the goals were set too high and thus served as stretch goals (in that fewer participants were able to achieve them than was expected). This, in turn, may have punished goal-oriented behavior for those who were unable to reach those goals.

**Table 8**

*Expected and Actual Performance Related to Tiered Goals*

| Percentile | Expected Performance | Actual Performance |
|---|---|---|
| 10th | 190 | 195 |
| 30th | 250 | 255 |
| 50th | 310 | 298 |
| 70th | 360 | 333 |
| 90th | 410 | 377 |

**Amount of Pay Earned**

An ANOVA was conducted to determine whether a difference existed between the three groups with respect to the amount of pay earned by participants. Table 9 displays the means and standard deviations for the amount of pay earned by each group. Table 10 displays the source table for the ANOVA, which indicated that there was no significant difference for the amount of pay earned by participants with respect to the type of pay system ($F = 0.17$, $p = 0.842$).

**Table 9**

*Means for Money Earned*

| Condition | Mean | *SD* |
|---|---|---|
| Fixed pay | $53.69 | $2.42 |
| Bonus pay | $52.89 | $10.02 |
| Piece-rate pay | $52.20 | $11.43 |
| Overall | $52.96 | $8.63 |

**Table 10**

*Source Table for One-Factor Analysis of Variance for Money Earned*

| Source | *df* | *SS* | *MS* | *F* | *p* |
|---|---|---|---|---|---|
| Experimental Conditions | 2 | 26.38 | 13.19 | 0.17 | 0.842 |
| Error | 68 | 5192.4 | 76.36 | | |
| Total | 70 | 5218.8 | | | |

## Questionnaire Analysis

All 71 participants answered the post-study questionnaire, which consisted of three questions. Each question used a 5-point Likert scale. In the case of the satisfaction question, 5 represented "completely satisfied" and 1 represented "completely dissatisfied". For the two stress questions, 5 represented "extremely stressful" and 1 represented "not at all stressful". The means and standard deviations for each of the three questions can be found in Tables 11, 12, and 13.

ANOVAs were conducted to determine if differences existed between the three groups for the pay system satisfaction and stress questions. Tables 14, 15, and 16 display the source tables for these analyses. The only significant finding was for the question "How stressful did you find the pay system to be?" ($F = 3.15$, $p = 0.049$). Fisher-Hayter tests determined that only participants who received bonus pay reported that the pay system was more stressful than only those who received fixed pay ($q = 3.57$, $p = 0.014$). There was no significant difference between the fixed pay group and piece-rate pay group, nor between the bonus pay group and piece-rate pay group.

**Table 11**

*Means for "How Satisfied Were You with the Pay System?"*

| Condition | Mean | *SD* |
|---|---|---|
| Fixed pay | 4.84 | 0.47 |
| Bonus pay | 4.67 | 1.71 |
| Piece-rate pay | 4.82 | 1.41 |
| Overall | 4.77 | 0.45 |

**Table 12**

*Means for "How Stressful Did You Find the Pay System to Be?"*

| Condition | Mean | *SD* |
|---|---|---|
| Fixed pay | 1.28 | 0.54 |
| Bonus pay | 1.71 | 0.69 |
| Piece-rate pay | 1.41 | 0.59 |
| Overall | 1.46 | 0.63 |

**Table 13**

*Means for "How Stressful Did You Find the Goals to Be?"*

| Condition | Mean | *SD* |
|---|---|---|
| Fixed pay | 2.00 | 0.76 |
| Bonus pay | 2.13 | 0.61 |
| Piece-rate pay | 1.91 | 1.02 |
| Overall | 2.01 | 0.80 |

**Table 14**

*One-Factor ANOVA Source Table for "How Satisfied Were You with the Pay System?"*

| Source | *df* | *SS* | *MS* | *F* | *p* |
|---|---|---|---|---|---|
| Experimental Conditions | 2 | 0.4283 | 0.2142 | 1.04 | 0.358 |
| Error | 68 | 13.9661 | 0.2054 | | |
| Total | 70 | 14.3944 | | | |

**Table 15**

*One-Factor ANOVA Source Table for "How Stressful Did You Find the Pay System to Be?"*

| Source | *df* | *SS* | *MS* | *F* | *p* |
|---|---|---|---|---|---|
| Experimental Conditions | 2 | 2.345 | 1.1727 | 3.15 | 0.049 |
| Error | 68 | 25.317 | 0.3723 | | |
| Total | 70 | 27.662 | | | |

**Table 16**

*One-Factor ANOVA Source Table for "How Stressful Did You Find the Goals to Be?"*

| Source | *df* | *SS* | *MS* | *F* | *p* |
|---|---|---|---|---|---|
| Experimental Conditions | 2 | 0.5427 | 0.2714 | 0.42 | 0.662 |
| Error | 68 | 44.4432 | 0.6536 | | |
| Total | 70 | 44.9859 | | | |

# DISCUSSION

## Primary Results

This study sought to determine whether a ranked ordering exists between the performance of participants when given tiered goals and one of three pay systems. It was hypothesized that the fixed pay group would perform the worst, the base pay with bonuses group would perform in the middle, and the piece-rate pay group would perform the best. The results of the primary analysis, a rank-based ANCOVA monotone method, showed no statistical significance for such an ordering. As a result, a one-factor ANCOVA was carried out to determine if any differences exist between the groups, albeit perhaps not in the hypothesized ordering. Consistent with earlier research that compared incentive systems to wage pay (Garbers & Konradt, 2014; Jenkin et al., 1998), the results of this analysis and subsequent Fisher-Hayter tests indicated that the fixed pay group performed significantly worse than both the base pay with bonuses group and the piece-rate pay group. However, the base pay with bonuses and piece-rate pay groups were not statistically different from one another. To summarize, participants who were given base pay with bonuses performed 13.7% better than those given fixed pay, and those given piece-rate pay performed 10.2% better than those given fixed pay.

The significant differences found between the fixed pay group and the piece-rate pay group partially replicated the results found by Ramos (2020) and Sundberg (2015). In Ramos (2020), participants who were given tiered goals and piece-rate pay outperformed those given tiered goals and fixed pay by 11.2%. In Sundberg (2015), the same comparison found a difference of 21.7% – however, perhaps due to the variability in Sundberg's participant performance, this result was not statistically significant. The findings of other earlier studies are similarly aligned where fixed pay and piece-rate pay are concerned, although these studies had

either no goals or a single goal (Chung & Vickery, 1976; Gaetani et al., 1985; LaMere et al., 1996; Lazear, 2000; Pritchard & Curtis, 1973; Terborg & Miller, 1978). In these studies, those who earned piece-rate pay outperformed those who earned fixed pay.

As indicated earlier, because of the non-significant finding from the rank-based ANCOVA monotone method, a one-factor ANCOVA and Fisher-Hayter tests were used to compare the adjusted average performance between the three groups. The results of the current study are therefore a noteworthy addition to the existing literature comparing piece-rate pay and base pay with bonuses (Lee et al., 1997; Mowen et al., 1981). In these earlier studies, when piece-rate pay was compared to base pay with bonuses, an interaction effect was discovered with respect to the performance of participants in each group, depending on which difficulty level their goal was set at. In summary, the piece-rate pay condition outperformed the base pay with bonuses condition when both groups were assigned the highest goal, and the base pay with bonuses condition outperformed when both were given a moderate goal (the results when given a low goal differed between the two studies). The current study, in contrast, found that there was no significant performance difference between these two groups when given tiered goals, rather than a single (low, moderate, or high) goal as in Lee et al. and Mowen et al. Thus, when feedback is provided, tiered goals may eliminate the interaction effects that occur when single goals are used, particularly when goals are difficult. Further, tiered goals may serve to bolster the effects of a bonus pay system to the level of being on par with a piece-rate pay system in terms of participant performance.

Organizations may be interested to know that a base pay with bonuses system paired with tiered goals could result in performance on par with that of piece-rate pay with tiered goals. Piece-rate pay systems are often challenging to implement and oversee, due to their complexity,

need for additional support, and (if all employees cannot be paid in the same manner) consequent inequity in pay (Dickinson & Gillette, 1994; Lawler, 1990, 2000). Thus, for many organizations, a base pay with bonuses system may be easier to implement and oversee than a piece-rate pay system, since the bonus pay is based on the achievement of goals rather than individual pieces. Granted, the development of a tiered goal system and monitoring of goal attainment is still more complex than a traditional fixed pay system, but the resulting increase in productivity may warrant the shift, especially if it results in performance on par with that of piece-rate pay. Additionally, a bonus system can likely be adapted to more types of jobs within an organization, such as those whose timelines to completion are lengthy, or those where outputs are not as easily quantifiable.

**Secondary Analyses**

One-factor ANCOVAs were used to compare the differences between the three groups with respect to time on task, data entry rate, and accuracy. In alignment with the primary analyses, a significant difference was found between the fixed pay group and base pay with bonuses group on both time on task and data entry rate. There was also a significant difference between the fixed pay group and piece-rate pay group with respect to time on task, but not with respect to data entry rate. No significant differences were found with respect to accuracy, likely because of a ceiling effect (the average accuracy of each group was near 100%).

In fact, the correlation between the number of correctly completed records and the data entry rate was quite high ($r = 0.91$), with the correlation between the number of correctly completed records and the time on task being slightly lower ($r = 0.73$). Both the base pay with bonuses group and piece-rate pay group were on task 10% more than the fixed pay group, on average. With respect to the data entry rate between these two comparisons, the base pay with

bonuses group was 12.4% above the fixed pay group, while the piece-rate pay group was only 4.5% above the fixed pay group. Thus, these findings indicate that time on task and data entry rate were likely the main drivers behind the performance difference observed between the groups. The strengths of these and the remaining correlations align with earlier research that has used similar data entry tasks and used the same dependent variables (Einarsson, 2018; McGee et al., 2006; Ramos, 2020; VanStelle, 2012).

Lastly, it is worth noting that accuracy was moderately correlated with the number of correctly completed records ($r = 0.45$). This implies that participants with higher accuracy were more likely to be higher performers, as well. In other words, high performance did not necessarily have an adverse impact on quality (accuracy). In fact, quite the opposite: A participant who emphasized quality was more likely to perform well, likely because the primary dependent variable of the study, the number of correctly completed records, is a measure of both quantity and quality.

**Tertiary Analyses**

No significant difference was found between any of the groups with respect to the number of times participants clicked to show the progress window during a session, nor with respect to the amount of time the progress window stayed open during each session. There were large standard deviations and minor differences between the averages of both dependent variables across the three groups. Thus, it is unlikely that the independent variables controlled the behavior of clicking to show the progress window.

**Questionnaire Analyses**

In all conditions, participants indicated they were very satisfied with their respective pay system. The overall mean rating was 4.77/5.00, with 5 indicating complete satisfaction and 1

indicating complete dissatisfaction. Similar to Ramos (2020) and Sundberg (2015), there was no significant difference found between any of the mean ratings, which ranged from 4.67 to 4.84, on this question.

With respect to participant stress with the tiered goals, results were similar in that there again was no significant difference between the groups. The overall mean rating was 2.01/5.00, with the mean group rating ranging from 1.91 to 2.13, where 1 indicated not at all stressful and 5 indicated extremely stressful. Thus, participants on average found the tiered goals to be slightly stressful. This again aligns with the findings of Ramos (2020); Sundberg (2015) did not question participants on their stress level related to the tiered goals.

Lastly, there was a significant difference discovered regarding how stressful participants found the pay systems to be. Although the overall rating of 1.46/5.00 indicated that participants found their respective pay system to be only slightly stressful (a rating of 1 indicated not at all stressful), the range was from an average of 1.28 for the fixed pay condition to an average of 1.71 for the base pay with bonuses group. These two groups were in fact the sole significant difference; no significant difference was found between the fixed pay and piece-rate pay groups, nor between the piece-rate pay and base pay with bonuses groups. Thus, one can conclude that the participants found the base pay with bonuses system to be more stressful than the fixed pay system. These findings are at odds with those of Ramos (2020) and Sundberg (2015). In Ramos, a significant difference was found between the piece-rate pay and fixed pay conditions, a difference that was not significant in the current study. In Sundberg, no significant difference between the stress ratings for the different pay systems was found, but this may have been a result of the high variability (consequently due to the small groups and goals that were set too high) in that study. The lack of a significant difference between the fixed pay and piece-rate pay

group in the current study (as well as Sundberg) with respect to the stress level of each type of pay system go against earlier research (Honeywell-Johnson et al., 2002; Johnson, 2005).

For the current study, this may have been due to the attrition rate that was witnessed in the piece-rate pay group, which lost 11 of a total of 33 recruited participants (33.3%). Eight of those 11 dropped out or were removed by the researcher (for not completing sessions on time) after having completed at least the covariate session. The fixed pay group had an attrition rate of 13.8% and the base pay with bonuses group had a rate of 14.3%. Thus, it is possible that, if participants dropped out from groups because of the stress resulting from the respective pay systems, the ratings given by the piece-rate pay participants would have been higher. In fact, this is entirely plausible, as one participant in the piece-rate pay group specifically asked to be removed from study after completing their first session, stating that it was too stressful. Consequently, the difference between the stress related to fixed pay and that related to piece-rate pay, which was found to be significant by earlier studies may have indeed been significant in the current study if only the questionnaire had been given to all participants, rather than only to those who completed the study.

**Other Analyses**

With respect to the tiered goals, the actual performance of participants in this study was not aligned with those of Ramos (2020), from which the goals in this study were determined. As a result, the third, fourth, and fifth goals were set too high. The overall average mean number of correctly completed records for the five experimental sessions was 291.3, which was nearly 20 records below the expected performance of 310. The primary contributor to this was the fixed pay with tiered goals group, which averaged 258.1 correct records in this study, compared to 290.5 of the fixed pay with tiered goals group in Ramos (a difference of 32.4). Similarly, the

piece-rate pay with tiered goals group in this study underperformed the equivalent group in Ramos by 30.6 correct records (the average performance of each was 297.5 and 328.1, respectively). Thus, it is possible that the cause is something specific about the methodology of this study compared to that of Ramos (see **Limitations**, below, for greater detail).

The amount of pay earned by participants between the groups was not significantly different. This is consistent with Ramos (2020) and indicates that the amount of pay participants earned was not responsible for the differences in performance found between the groups. In this study, the overall average pay earned by participants was $52.96, with the low end being the piece-rate pay condition earning $52.20 and the high end being the fixed pay condition earning $53.69.

Stemming from the disparity between the groups in the current study and the equivalent groups in Ramos (2020), ANCOVAs were run on the average number of correctly completed records between like groups from each study. A statistically significant difference was found in the both cases: The fixed pay with tiered goals groups ($F = 10.35$, $p = 0.002$), as well as the piece-rate pay with tiered goals groups ($F = 16.40$, $p < 0.001$). Thus, performance in the current study was significantly lower than that of Ramos in the case of both the fixed pay group and the piece-rate pay group. The possible causes for this are discussed in **Limitations**, below.

**Strengths**

This was the first study to use this experimental task in a remote setting and to compare the performance of remote participants to that of in-person participants (from an earlier study). Additionally, because of the experimental control resulting from the manipulation of the conditions in this study, the effects of the independent variables were isolated not only from each other, but also from other common variables found in applied settings. The researcher also took

great care to ensure that communication with participants did not include any sort of evaluative feedback, as it may have impacted their performance.

Finally, because this was the first time this experimental task was carried out remotely, many discoveries were made that will allow future researchers who use the same task in remote settings to have greater experimental control and fewer challenges to overcome. The main of these discoveries was regarding instructions and interactions with participants, to ensure that they completed everything that was required of them with their sessions (and that they did so in a timely manner). To that end, instructions were explicit, sessions were scheduled for specific times chosen by the participants, and reminder e-mails were sent 15 minutes before those times. Technological challenges were also prominent, and so much care was taken with respect to the specificity of the onboarding and training of participants (including having them engage in everything they would need to do for their sessions), as well as ensuring that e-mail communications included reminders on both the most critical and the most often forgotten (or incorrectly done) aspects of the sessions.

**Limitations**

It is worth noting that the calculations for participant pay in the current study were based on the piece-rate pay of an average participant at $0.03 per correct record. In Ramos (2020), it was based on $0.02 per correct record. This change was an attempt to update the pay amount to align with changes in the minimum wage. However, it may have ultimately been responsible for the disparity in the data between similar groups from Ramos and the current study. Because participants in the incentive pay groups of the current study could perform at a lower comparable level and yet earn the same as in Ramos 2020, it is possible that this made it so that participants consequently performed at those lower levels. However, participants in the current study had not

participated in this experimental task before – and many were first-year students in their first semester – so it is unlikely that their performance would have been limited by a self-stated ceiling based on the previous research.

What is more likely is that, because the highest three goals were set too high, the majority of participants were not able to meet each higher goal level, and thus average performance peaked below the third goal. In effect, the average effort made by over 50% of participants was not followed by attainment of the third goal, with that trend continuing for the fourth and fifth goals (where over 70% and 90% of participants, respectively, did not attain the goal). As such, these higher-level goals were more akin to stretch goals and so performance was not reinforced in those majority of cases, making it so that overall performance was lower than expected. However, this is truer for the fixed pay and piece-rate pay groups (whose pay was not dependent on goal attainment) than it is for the base pay with bonuses group, whose average performance was actually ten records *above* the third goal.

It is also likely that participant performance was undermined by the fact they were engaging in the experimental task remotely. In Ramos (2020), participants engaged in the task in a laboratory setting, with all participants using the same three identical desktop computers with Microsoft Windows operating system installed. In the current task, participants were free to do the task in a location of their choosing, so long as they were uninterrupted for the 45 minutes, and they had to use their personal computer. For the overwhelming majority of participants, their personal computer was a laptop, and for nearly half (47.8%) of them, the operating system was Macintosh. While no significant difference was found between the performance of participants based on their computer's operating system in the current study, it is clear that something about

the setting and apparatus of their sessions did negatively impact their performance compared to those in Ramos.

Three possible causes for this exist: (a) the typical laptop computer does not have a number pad on the keyboard, and participants may not have had a separate mouse, so instead they had to rely on the trackpad to engage in the experimental task; (b) as much as participants carried out their sessions in areas where they would not get interrupted, competing contingencies were ever present; and (c) with the exception of the recordings and their performance being tracked by the program, participants were entirely unsupervised during their 45-minute sessions.

Cause (a) can likely be dismissed because, when a *t*-test was performed on the covariate data comparing all participants in the current study to those in Ramos (2020), no significant difference was discovered ($t = 1.43$, $p = 0.153$). In fact, the average performance of participants in the covariate session for the current study was 247.8, compared to 234.3 in Ramos. In addition to this, the nature of the covariate session in the analysis accounts for the impact of the difference in equipment in that all of the experimental sessions completed by participants were presumably completed using the same equipment as in the covariate session, and so their performance is adjusted accordingly. Thus, it is unlikely that the type of computer participants used was the main hindrance to their performance in this study.

More likely, it was cause (b), the competing contingencies in the environment of the participant. Based on the review of the video recordings taken by participants of their sessions, the overwhelming majority completed their experimental sessions at home (be it their dorm room, apartment, or house). Furthermore, although participants were allowed to listen to music, play games, etc. during their sessions (just as in Ramos, 2020), the average amount of time spent on task by participants in both the fixed pay with tiered goals and piece-rate pay with tiered goals

groups in the current study was 2507.6 seconds compared to 2557.5 seconds for the same two groups in Ramos. Similarly, the average data entry rate was 6.59 in the current study compared to 7.20 in Ramos. Furthermore, recall that time off task is defined as any pause in responding *greater* than 30 seconds. Thus, any distractions that took less than 30 seconds (sending a quick text to a friend, for example) were not accounted for by the time on task measurement. Anecdotally, in their videos, participants were seen spending time on their phone, lounging on their bed, eating snacks, engaging with their pet, talking to their roommate, and even taking a quick phone call. The methodological differences between the current study and Ramos, caused by the differences in setting, unfortunately do not allow for a similar anecdotal telling of the events that transpired during participants' sessions (they were on the opposite side of a partition as the researcher). However, many of the distractions that occurred in the current study would not have been possible in Ramos: Pets were not allowed in the laboratory, participants were not allowed to make phone calls because it would have distracted other participants, no food or drinks were allowed at the computers, etc.

Finally, to cause (c): In Ramos (2020), due to the laboratory setting, it was possible that a researcher would witness the participant being off task during the session. After all, there were times when three participants were engaging in the task simultaneously (on three separate computers), all separated from the researchers by a partition. Any time a participant started or ended a session, a researcher had to cross that partition to prepare or close down the session for that participant, and so the researcher would be in sight of the remaining participants. Thus, even though participants in both studies were explicitly told that they could engage in other activities during their session, it is possible that the resulting social pressures (of being "caught" off task

by a researcher) perceived by the participants in Ramos, which were not present in the current study, increased the overall performance of participants.

While the aforementioned confounds were perhaps detrimental to the experimental control and, therefore, the results of this study, those same uncontrolled variables are likely to be a common part of a work-from-home setting. In other words, when employees work remotely, the contingencies present in their day-to-day will of course be different than those if they were working in an office. Furthermore, the competing contingencies are going to be different for every employee, depending on their home environment. Thus, while the confounds were perhaps a weakness in this study, they also provided for a more realistic approximation of a true work-from-home environment.

**Future Research**

The current study resulted in what could become a bifurcation in the lines of research within the performance literature. On the one hand, further research should continue with respect to the disparities between in-person and remote work. This is particularly relevant as we are still in the midst of the Coronavirus-19 pandemic, with many jobs becoming remote. On the other hand, the line of research with tiered goals would greatly benefit from further enlightenment. While this study replicated some earlier findings (Ramos, 2020), it also created an opportunity for determining whether piece-rate pay and bonus pay truly are not significantly different when tiered goals are leveraged.

On the branch of in-person versus remote work, research could be done to compare one condition where participants engage in the task in a laboratory setting to another condition where they engage in the task remotely (as in this study). Of course, researchers would have to be very deliberate in their design of the experiment to ensure that social contingencies, supervision,

feedback, and settings/apparatus are held constant where possible. For example, participants could use their own computer in both conditions, and the researcher could run a single participant at a time, only preparing them for the session and then disappearing for the length of the session. It would also be interesting to see the results of a study designed to determine whether varying levels of oversight during remote work impact the quantity and quality of performance. For example, one condition could be as in this study, where participants were given written instructions for their sessions but otherwise left to themselves to complete the sessions; another condition could have the researcher set them up for the session and remain on a video call during the session, but not focused on the participants; and yet another condition could involve the researcher being fully involved in the session.

On the branch of continuing with tiered goals, future researchers could begin by looking at the difference of in-person performance between piece-rate pay and base pay with bonuses, each with the same five tiered goals as used in this study, but also without tiered goals in the case of piece-rate pay. Depending on the outcomes of that study, and comparing to the results of this current study, later research could delve into manipulating the quantity of tiered goals. If indeed base pay with bonuses is equivalent to piece-rate pay when participants are given tiered goals, then it is possible that there is a "sweet spot" with respect to the number of tiered goals, where performance in the bonus pay condition will begin to approximate that of a piece-rate pay condition. If so, it would be useful for organizations to know where that sweet spot exists, as it would potentially reduce the effort required to create and oversee a goals-and-bonus system while ensuring peak performance. This would also possibly expand the number and types of jobs to which businesses could more easily create incentive systems that would result in top-tier performance.

## Summary

The results of this study contribute to the goal-setting literature by partially replicating the results of Ramos (2020) in a remote setting: Piece-rate pay with tiered goals results in higher performance than fixed pay with tiered goals. Additionally, at least within the methodology of this research, base pay with bonuses and tiered goals results in equivalent performance levels as piece-rate pay with tiered goals. This is potentially a major finding for organizations, in that a goals-and-bonus system is generally easier to implement than a piece-rate pay system.

It is also worth noting that the comparisons between in-person and remote work, made between Ramos (2020) and the current study, lend insight into the effects of either setting on performance. Tentatively, participants in a remote setting performed significantly worse than those completing the task in a laboratory. Of course, methodological differences between the two studies need to be addressed for this to be more confidently stated.

As such, it is hoped that future researchers will investigate whether a disparity indeed exists between the performance of in-person and remote workers. It is also hoped that future researchers will continue to pursue the questions relating to comparisons of piece-rate pay and base pay with bonuses, both with tiered goals. The ultimate outcome for these lines of research is to uncover the answers for organizations regarding whether in-person or remote settings result in better performance (and how best to structure the contingencies within each), and whether employees are best incentivized by a simpler means than piece-rate pay.

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Appendix A

HSIRB Approval Letter

# WESTERN MICHIGAN UNIVERSITY

**Human Subjects Institutional Review Board**

Date: October 26, 2021

To: Douglas Johnson, Principal Investigator
Alejandro Ramos, Student Investigator for dissertation

From: Amy Naugle, Ph.D., Chair

Re: IRB Project Number 21-10-10

This letter will serve as confirmation that your research project titled "A Comparison of Fixed Pay, Piece-Rate Pay, and Bonus Pay when Performers Receive Tiered Goals" has been **approved** under the **expedited** category of review by the Western Michigan University Institutional Review Board (IRB). 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 to this project (e.g., ***add an investigator, increase number of subjects beyond the number stated in your application, etc.***). 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 IRB for consultation.

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

**A status report is required on or prior to (no more than 30 days) October 25, 2022 and each year thereafter until closing of the study.**

**When this study closes, submit the required Final Report found at https://wmich.edu/research/forms.**

**Note: All research data must be kept in a secure location on the WMU campus for at least three (3) years after the study closes.**

251 W. Walwood Hall, Kalamazoo, MI 49008-5456
PHONE: (269) 387-8293, FAX: (269) 387-8276

Appendix B

Participant Recruitment Script

Hello, my name is Alejandro Ramos. 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 simulated medical data entry task.

The data entry task is a simple, computer-based task that requires someone to read and enter numbers using a computer's numeric keypad. You will be working on this task remotely, using your own computer. There will be six sessions during the semester, each 45 minutes long, which you can schedule as like, but no more than once per day, and must be completed within six weeks of beginning the study. You will earn approximately $9.30 per session, and thus about $55.80 if you complete the study.

In order to participate, you must not have participated in other studies that have used the medical data entry task, must not have taken PSY 3440 (Organizational Psychology), and must not have taken nor be currently enrolled in PSY 2444 or PSY 3444. You must also be available for six sessions throughout the semester, have your own computer with a webcam, and have WebEx and Loom (video-recording software, free from Google) installed on that computer.

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 in this study will be kept confidential.

If you are interested in participating and you would like further information about this study, please e-mail alejandro.ramos@wmich.edu or text Alejandro at (616) 648-0445.

Thank you for your time and, for any of you who choose to participate, thank you in advance for your help with my dissertation!

HSIRB Approval #:

# Seeking Research Participants!

You will be paid approximately $9.30 per session (~$55.80 total)

You must meet the following requirements:

- Be available for six 45-minute sessions this semester
- Have your own Windows or Macintosh computer with a webcam
- Not have taken nor be currently enrolled in PSY 2444 or PSY 3444
- Not have participated in another study with the medical data entry task

E-mail **alejandro.ramos@wmich.edu** or text/call **(616) 648-0445**

Appendix C

Participant Consent Form

**Western Michigan University**
**Department of Psychology**

**Principal Investigator:** Douglas A. Johnson, Ph.D.
**Student Investigator:** Alejandro Ramos, M.A.
**Title of Study:** Performance on a Simulated Medical Data Entry Task

You have been invited to participate in a research project titled "Performance on a Simulated Medical Data Entry Task." This project will serve as Alejandro Ramos's dissertation under the supervision of Douglas A. Johnson, Ph.D. This consent document will explain the purpose of this research project and will go over all of 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 computer-based simulated medical data entry task.

**Who can participate in this study?**
We are recruiting college students enrolled in courses at Western Michigan University. There are four criteria you must meet in order to participate: 1) You must not have previously participated in research that used the medical data entry task. 2) You must not have taken Organizational Psychology (PSY 3440) and must not have taken or be currently enrolled in Organizational Psychology (PSY 2444) or Advanced OBM (PSY 3444). 3) You must be available for six 45-minute sessions throughout this semester and cannot take more than six weeks to complete the study. 4) You must have your own computer with a functional webcam and Windows or Macintosh operating system.

**Where will this study take place?**
The initial meeting with the researcher will be via WebEx, a video-conferencing application, on your personal computer. Therefore, you will need to have WebEx installed on your computer. For students of Western Michigan University (WMU), WebEx is available for free. Future sessions will be again be held on your personal computer. For these, you will need to install Loom, a video-recording program available for free from Google, and Microsoft Excel, available for free for students of WMU.

**What is the time commitment for participating in this study?**
You must be available for six 45-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 record 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. During the sessions, you

will also be asked to video record yourself and your computer screen. 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. You will also be recording your sessions using Loom and providing those recordings to the experimenter. Lastly, at the end of the study, you will be asked to indicate your satisfaction with the procedures in the study and how much stress you felt during the study.

**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 a game on your computer, browse the internet, or spend time on your cell phone.

**What are the benefits of participating in this study?**
You will be contributing to the field of research on performance. You may also learn about this through your participation in this 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 time commitment, there are no costs associated with participation in this study.

**Is there any compensation for participating in this study?**
For each 45-minute session including the training session, you will earn about $9.30 for a total of $55.80, but the amount you earn may be dependent on your performance. You will be paid in cash or by Venmo at the end of the $6^{th}$ 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 group data will be presented. Neither your name nor any identifying characteristics will be used. Video recordings will be stored on a password-protected computer accessible only by the student investigator and will be deleted upon the conclusion of data analysis.

**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 can e-mail Alejandro Ramos at alejandro.ramos@wmich.edu. You may also contact the primary investigator Dr. Douglas Johnson at douglas.johnson@wmich.edu You may also contact 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 study was approved by the Western Michigan University Institutional Review Board (WMU IRB) on October 26, 2021

I have read this informed consent document. By clicking on the link below, I agree to take part in this study and agree to the use of video and audio recordings.

https://qfreeaccountssjc1.az1.qualtrics.com/jfe/form/SV_d1rqeX1Skwpv1yt

Appendix D

Participant Qualification Questionnaire

Name:

Sex:

Age:

Have you ever participated in a study at WMU that required you to use a medical data entry task?

- Yes
- No

Have you taken, or are you currently taking PSY 2444 (Organizational Psychology) or PSY 3444 (Advanced OBM)?

- Yes
- No

Are you available to complete the six 45-minute sessions within six weeks of beginning this study?

Yes

No

Do you have your own Windows or Macintosh computer with a functional webcam?

Yes

No

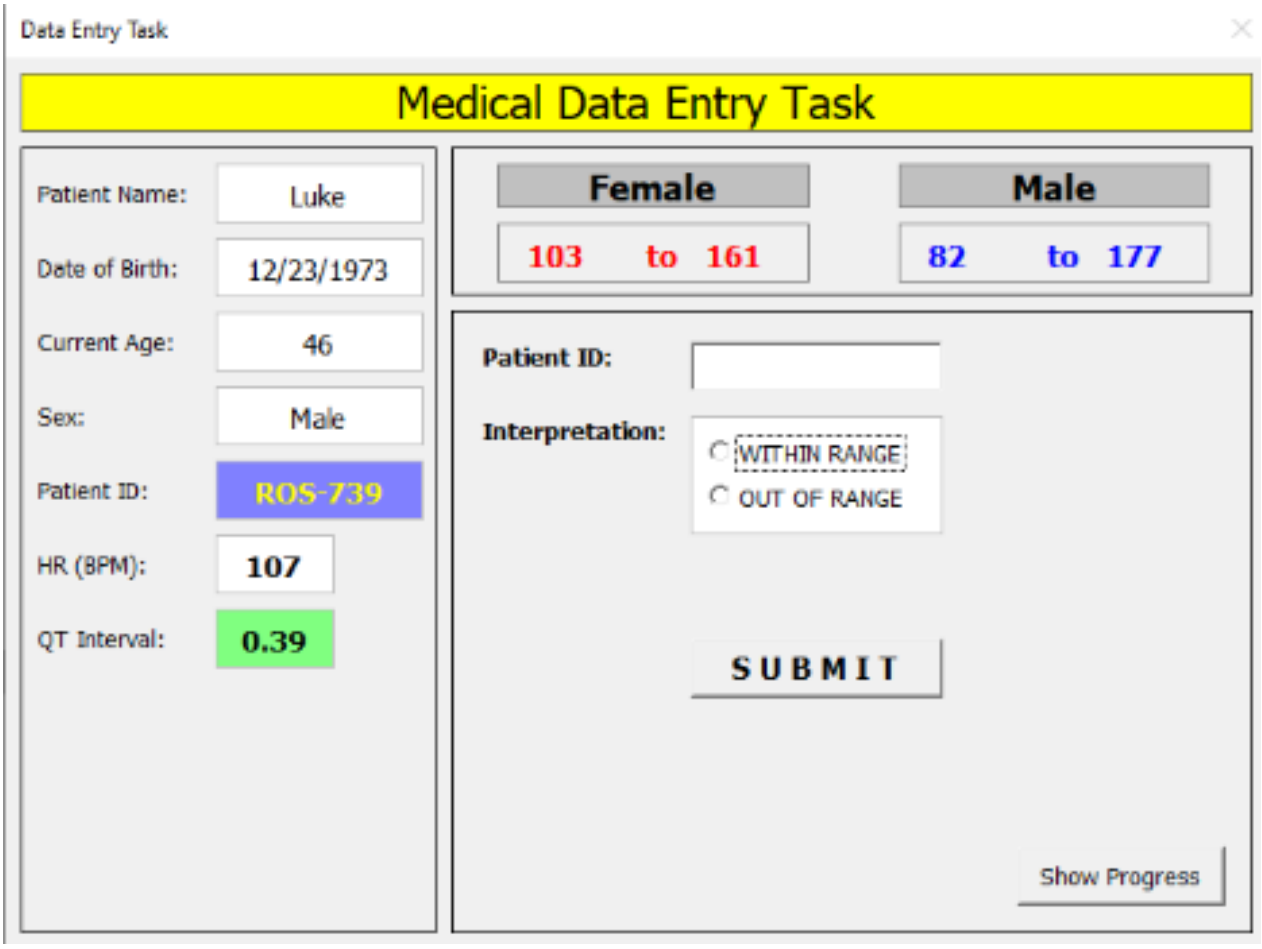
By selecting "I consent" below and submitting this form, you indicate that you have reviewed the consent form and agree to voluntarily participate in this research study.

I consent

I do not consent

Appendix E

Medical Record Data Entry Task Screenshot


Data Entry Task
Medical Data Entry Task
Patient Name:
Luke
Date of Birth:
12/23/1973
Current Age:
46
Sex:
Male
Patient ID:
ROS-739
HR (BPM):
107
QT Interval:
0.39
Female
103 to 161
Male
82 to 177
Patient ID:
Interpretation:
WITHIN RANGE
OUT OF RANGE
SUBMIT
Show Progress

Appendix F

Instructional Script for Introductory Session

**INTRODUCTORY SESSION SCRIPT (ALL GROUPS)**

Forty-eight hours before meeting with the participant for their introductory session, send them the below text in an e-mail, along with a copy of the consent form and the "Medical Data Record Entry Task – Introduction" file which you will attach to the same e-mail. Also send the participant a separate 30-minute WebEx meeting invitation scheduled at the agreed-upon time for the introductory session meeting.

*Hello [Participant's Name],*

*Thank you for your willingness to participate in our research study.*

***Before*** *you meet with the researcher via WebEx, please do the following:*

1. *Read through the attached consent form*
2. *Once you have read the consent form, if you choose to participate, then please fill out the consent form and questionnaire by visiting https://qfreeaccountssjc1.az1.qualtrics.com/jfe/form/SV_d1rqeX1Skwpv1yt (this is the same link that is within the consent form document)*
3. *If you do not have Microsoft Excel installed on your computer, please follow these steps:*
    a. *Visit http://wexchange.wmich.edu*
    b. *Log in with your WMU username and password*
    c. *Click the Home button at the top left*
    d. *Click on "Install Office" at the top right*
    e. *In the drop-down, select "Office 365 Apps"*
    f. *Follow through with the installation process*
4. *If you do not have Loom installed on your computer, please do the following:*
    a. *Visit https://www.loom.com/signup*
    b. *If you don't already have an account, create one. Otherwise, log in.*
    c. *At the top right, click "More"*
    d. *In the drop-down, select "Desktop App; a new window will open*
    e. *Select "Install App" under the Desktop App on the left-hand side of the window*
    f. *Follow through with the installation process*

*You will receive a separate e-mail for a WebEx meeting invitation scheduled for the time we discussed. When that time comes, please click on the link within that e-mail to open up and begin the meeting with me.*

*If you have any questions between now and then, please don't hesitate to ask.*

*I look forward to meeting with you,*

*[Your Name]*

During your WebEx meeting with the student, you will do the following:

1. Ensure that they:

a. Have a functioning webcam
b. Filled out the Qualtrics consent form and questionnaire
    i. If they have completed the form and they both qualify for and consented to the study, assign them a participant number
c. Installed Microsoft Excel 365 on their computer
    i. If they have not or are having difficulties, walk them through how to do this by following the steps on the previous page for downloading Excel
d. Installed Loom on their computer
    i. If they have not or are having difficulties, walk them through how to do this by following the steps on the previous page for downloading Loom

2. Walk the participant through how to use Loom on their computer. To do this, share your screen with them. Open Loom, and for the remainder of this step, speak aloud what you are doing. Select "Screen + Cam" and "Full Screen", then click "Start Recording". After a few seconds have passed, click the "Stop Recording" button at the left of the screen. In the window that opens in your web browser, click the "Copy Link" button, go to Outlook, and paste that link into a blank e-mail.
3. Next, walk the participant through how to use the experimental task. To do this, again share your screen with the student. Open "Medical Data Record Entry Task – Researcher" file. Tell the student that they may have to click to "Enable Macros" just underneath the top ribbon when they first open up the program. Then, enter in their participant number and click the "Start" button. Now, read aloud the following script while indicating the relevant areas on your screen:

> *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. Then, look at whether the patient is male or female. You can determine that by looking at the "Gender" box or by whether there is an "F" or "M" in the ID number. Next, 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."*

Complete two records on your screen before continuing with the below script:

> *If you want to track your progress, you can click on the "Show Progress" button. The window that opens will show you how many total records you have completed, how many were correct, and how much time remains in the session. To close the window, simply click the same button which now says "Hide Progress". Today, we would like for you to get comfortable with the task, so you will only perform the task for five minutes. Future tasks will be 45 minutes each.*

Close out of your Excel window and ask the participant to share their screen on WebEx. Then, have them open Loom and the "Medical Data Record Entry Task – Introduction" file on their computer. Next, have them begin recording their screen and camera using Loom. Finally, have them start the experimental task and read the following script:

*The computer will keep a running total of the number of completed and correctly completed records. The program keeps track of your performance. You may minimize the data entry task, but under no circumstances should you close the program or open any other Excel files. If you do, you will have to begin the session over again. If you choose to take a break, feel free to browse the internet, spend time on your cell phone, or play on your computer. Today, we'd like you to practice the task for five minutes. After the five minutes have passed, the program will automatically end and will prompt you to save the file. At that point, please wait for my instructions. Please enter your participant number into the box and click "Start" when you are ready.*

Once the "Save As" dialogue box opens on the participant's Excel window, walk them through how to save the file and attach it to an e-mail addressed to alejandro.ramos@wmich.edu. Also have them stop their Loom recording and copy-paste the Loom link into that same e-mail. Once they have sent the e-mail, respond to any questions they might have. After the participant feels comfortable with the procedures, schedule their next session (or all six, if possible), explain that there will be no WebEx meetings until after their final session (everything will be handled via e-mail from the researcher's end), and thank them for their time and participation.

Appendix G

Instructional Script for Pre-Experimental (Covariate) Session

**PRE-EXPERIMENTAL (COVARIATE) SESSION SCRIPT (ALL GROUPS)**

Send the following text in an e-mail to the participant, with the subject line "Medical Record Data Entry Task – Session 1, Participant #[###]" (replacing [###] with the participant's number), and with the "Medical Record Data Entry Task – Session 1" Excel file attached to the e-mail.

> *Hello [Participant's Name],*
>
> *The medical record data entry task for your first session is attached to this e-mail. Please read the following before you begin your session:*
>
> *During this 45-minute session, please do your best to correctly complete as many records as you can. We are assessing your keyboard proficiency on the task, which could affect how you perform the task in the future. You will be paid $0.03 per correctly completed record for this first session (for example, if you complete 100 records, you will earn $3.00). We will pay you, in cash or by Venmo, at the end of the study for this session and every following session that you attend. As a reminder, you may minimize the data entry task, but under no circumstances should you close the program or open another Excel file. If you do, you will have to begin the session over again.*
>
> *The recording of your session may or may not be viewed afterward, and your performance is monitored by the experimental task. After you start the medical entry task, remember that you can always see how many records you have completed correctly by clicking the "Show Progress" button. Once the 45 minutes are up and the task automatically ends, please follow the instructions provided within the task window. Then, attach the newly-saved task file to an e-mail addressed to alejandro.ramos@wmich.edu, along with the link from Loom after you stop recording. Remember, for this session, it is very important that you complete as many records as you can because we are assessing your keyboard proficiency.*
>
> *When you are ready, open Loom and begin recording* ***both your screen and camera****, then open the medical record data entry task file attached to this e-mail and start the experimental task.*
>
> *Thank you for your participation,*
> *[Your Name]*

Appendix H

Instructional Script for Pay Quiz

**PAY QUIZ SCRIPT (FIXED PAY GROUP)**

Immediately after the participant has sent their e-mail with the items from their first session, please send them the following text in a separate e-mail with the subject line "Medical Record Data Entry Task – Pay Information".

*Hello [Participant's Name],*

*During your previous session, you completed [###] correct records and will be receiving $[#.##].*

*Before we begin your second session, I want to tell you how you will be paid for all of your remaining sessions. Once you have read through this, I would like to make sure you understand this by having you answer the "quiz" questions at the end of this e-mail. You must answer them all correctly in order to pass, but I can ask you multiple versions of these questions until you achieve that. If you don't score 100% your first time, I will go over the items you missed and explain to you why you missed them, after which you can take another version of those same questions.*

*At the end of the study, which is six sessions long, you will be paid $9.30 for each 45-minute session that you attend. In total, you would receive $46.50, plus the $[#.##] you earned from the previous session, for a grand total of $[##.##] after attending all six sessions. You have already attended one session, and your next session will be your second.*

*There are also five goals which are simply performance targets for you to hit, each progressively harder than the next. The goals have no bearing on your pay, but I encourage you to meet them. The goals are 190, 250, 310, 360, and 410 correctly completed records. With that being said, let's have you take the quiz, now.*

*As a reminder, individuals are paid $9.30 for every session,* ***regardless of how many medical records they correctly process****. Please answer the following questions based on the pay system.*

1. *James correctly processed 225 medical records during a session. How much money did James earn for that single session?*
2. *Michelle processed 429 medical records during a session, but only 368 were correct. How much money did Michelle earn for that single session?*
3. *Jose correctly processed 485 medical records during a session. How much money did Jose earn for that single session?*

*Please reply to this e-mail with your answers. If you have any questions, please feel free to ask them in that e-mail, as well. I will respond back with your score on this quiz and answer your questions you have. If you missed any items on the quiz, I will provide feedback and give you new questions to answer.*

*Thank you for your time,*
*[Your Name]*

**PAY QUIZ SCRIPT (PIECE-RATE PAY GROUP)**

Immediately after the participant has sent their e-mail with the items from their first session, please send them the following text in a separate e-mail with the subject line "Medical Record Data Entry Task – Pay Information".

*Hello [Participant's Name],*

*During your previous session, you completed [###] correct records and will be receiving $[#.##].*

*Before we begin your second session, I want to tell you how you will be paid for all of your remaining sessions. Once you have read through this, I would like to make sure you understand this by having you answer the "quiz" questions at the end of this e-mail. You must answer them all correctly in order to pass, but I can ask you multiple versions of these questions until you achieve that. If you don't score 100% your first time, I will go over the items you missed and explain to you why you missed them, after which you can take another version of those same questions.*

*At the end of the study, which is six sessions long, you will be paid $0.03 for each medical record entry that you correctly complete. Thus, your pay is based on your performance. For instance, if you were to correctly complete 400 records each session, you would earn $12.00 each session and therefore a total of $60.00 for the remaining five sessions, plus the $[#.##] from this previous session for a grand total of $[#.##] for the study.*

*There are also five goals which are simply performance targets for you to hit, each progressively harder than the next. The goals have no bearing on your pay, but I encourage you to meet them. The goals are 190, 250, 310, 360, and 410 correctly completed records. With that being said, let's have you take the quiz, now.*

*As a reminder, individuals are paid 3 cents for every medical record correctly processed during their sessions. Please answer the following questions based on the pay system.*

1. *James correctly processed 225 medical records during a session. How much money did James earn for that single session?*
2. *Michelle processed 429 medical records during a session, but only 368 were correct. How much money did Michelle earn for that single session?*
3. *Jose correctly processed 485 medical records during a session. How much money did Jose earn for that single session?*

*Please reply to this e-mail with your answers. If you have any questions, please feel free to ask them in that e-mail, as well. I will respond back with your score on this quiz and answer your questions you have. If you missed any items on the quiz, I will provide feedback and give you new questions to answer.*

*Thank you for your time,*
*[Your Name]*

**PAY QUIZ SCRIPT (BONUS PAY GROUP)**

Immediately after the participant has sent their e-mail with the items from their first session, please send them the following text in a separate e-mail with the subject line "Medical Record Data Entry Task – Pay Information".

*Hello [Participant's Name],*

*During your previous session, you completed [###] correct records and will be receiving $[#.##].*

*Before we begin your second session, I want to tell you how you will be paid for all of your remaining sessions. Once you have read through this, I would like to make sure you understand this by having you answer the "quiz" questions at the end of this e-mail. You must answer them all correctly in order to pass, but I can ask you multiple versions of these questions until you achieve that. If you don't score 100% your first time, I will go over the items you missed and explain to you why you missed them, after which you can take another version of those same questions.*

*At the end of the study, which is six sessions long, you will be paid $4.80 for each 45-minute session, plus $1.50 for each goal level you reach, up to $7.50 (for a total of $12.30) for reaching the highest goal. Thus, your pay is partially based on your performance. Each goal level is progressively harder than the next: they are 190, 250, 310, 360, and 410 correctly completed records.*

*So, for instance, if you were to correctly complete 400 records each session, you would earn $4.80 + ($1.50 x 4) = $10.80 each session, and therefore a total of $54.00 for the remaining five sessions. In this example, your grand total for the study would then be $54.00 plus the $[#.##] from your previous session for a grand total of $[#.##]. With that being said, let's have you take the quiz, now.*

*As a reminder, individuals are paid $4.80 per session, plus $1.50 for each higher goal level they reach. Please answer the following questions based on the pay system.*

1. *James correctly processed 225 medical records during a session. How much money did James earn for that single session?*
2. *Michelle processed 429 medical records during a session, but only 368 were correct. How much money did Michelle earn for that single session?*
3. *Jose correctly processed 485 medical records during a session. How much money did Jose earn for that single session?*

*Please reply to this e-mail with your answers. If you have any questions, please feel free to ask them in that e-mail, as well. I will respond back with your score on this quiz and answer your questions you have. If you missed any items on the quiz, I will provide feedback and give you new questions to answer.*

*Thank you for your time,*
*[Your Name]*

Appendix I

Quizzes for the Pay Systems

**FIXED PAY QUIZ #1**

Individuals are paid $9.30 for each session, regardless of how many medical records they correctly complete. Please answer the following questions based on the pay system.

1. James correctly processed 225 medical records during a session. How much money did James earn for that single session?

   **ANSWER: $9.30**

2. Michelle processed 429 medical records during a session, but only 368 were correct. How much money did Michelle earn for that single session?

   **ANSWER: $9.30**

3. Jose correctly processed 485 medical records during a session. How much money did Jose earn for that single session?

   **ANSWER: $9.30**

**FIXED PAY QUIZ #2**

Individuals are paid $9.30 for each session, regardless of how many medical records they correctly complete. Please answer the following questions based on the pay system.

1. Olivia correctly processed 427 medical records during a session. How much money did Olivia earn for that single session?

   **ANSWER: $9.30**

2. Nate processed 376 medical records during a session, but only 341 were correct. How much money did Nate earn for that single session?

   **ANSWER: $9.30**

3. Danielle correctly processed 250 medical records during a session. How much money did Danielle earn for that single session?

   **ANSWER: $9.30**

**PIECE-RATE PAY QUIZ #1**

Individuals are paid 3 cents for every medical data record correctly processed during their sessions. Please answer the following questions based on the pay system.

1. James correctly processed 225 medical records during a session. How much money did James earn for that single session?

   **ANSWER: $6.75**

2. Michelle processed 429 medical records during a session, but only 368 were correct. How much money did Michelle earn for that single session?

   **ANSWER: $11.04**

3. Jose correctly processed 485 medical records during a session. How much money did Jose earn for that single session?

   **ANSWER: $14.55**

**PIECE-RATE PAY QUIZ #2**

Individuals are paid 3 cents for every medical data record correctly processed during their sessions. Please answer the following questions based on the pay system.

1. Olivia correctly processed 427 medical records during a session. How much money did Olivia earn for that single session?

   **ANSWER: $12.81**

2. Nate processed 376 medical records during a session, but only 341 were correct. How much money did Nate earn for that single session?

   **ANSWER: $10.23**

3. Danielle correctly processed 250 medical records during a session. How much money did Danielle earn for that single session?

   **ANSWER: $7.50**

**BONUS PAY QUIZ #1**

Individuals are paid $4.80 for each session plus $1.50 for each progressively higher goal level they attain during that session. Please answer the following questions based on the pay system.

1. James correctly processed 225 medical records during a session. How much money did James earn for that single session?

   **ANSWER: $6.30**

2. Michelle processed 429 medical records during a session, but only 368 were correct. How much money did Michelle earn for that single session?

   **ANSWER: $10.80**

3. Jose correctly processed 485 medical records during a session. How much money did Jose earn for that single session?

   **ANSWER: $12.30**

**BONUS PAY QUIZ #2**

Individuals are paid $4.80 for each session plus $1.50 for each progressively higher goal level they attain during that session. Please answer the following questions based on the pay system.

1. Olivia correctly processed 427 medical records during a session. How much money did Olivia earn for that single session?

   **ANSWER: $12.30**

2. Nate processed 376 medical records during a session, but only 341 were correct. How much money did Nate earn for that single session?

   **ANSWER: $9.30**

3. Danielle correctly processed 250 medical records during a session. How much money did Danielle earn for that single session?

   **ANSWER: $7.80**

Appendix J

Instructional Script for Experimental Sessions 1 – 5

**EXPERIMENTAL SESSION 1 SCRIPT (FIXED PAY GROUP)**

Send the following text in an e-mail to the participant, with the subject line "Medical Record Data Entry Task – Session 2, Participant #[###]" (replacing [###] with the participant's number), and with the "Medical Record Data Entry Task – Session 2" Excel file attached to the e-mail.

*Hello [Participant's Name],*

*During your previous session, you completed [###] correct records and will be receiving $[#.##].*

*The medical record data entry task for your second session is attached to this e-mail. Please read the following before you begin your session:*

*The goals for this session and all following sessions are below:*

*Level 1: Correctly complete 190 records*
*Level 2: Correctly complete 250 records*
*Level 3: Correctly complete 310 records*
*Level 4: Correctly complete 360 records*
*Level 5: Correctly complete 410 records*

*As a reminder, you may minimize the data entry task, but under no circumstances should you close the program or open another Excel file. If you do, you will have to begin the session over again.*

*The recording of your session may or may not be viewed afterward, and your performance is monitored by the experimental task. After you start the medical entry task, remember that you can always see how many records you have completed correctly by clicking the "Show Progress" button. Once the 45 minutes are up and the task automatically ends, please follow the instructions provided within the task window. Then, attach the newly-saved task file to an e-mail addressed to alejandro.ramos@wmich.edu. Also remember to share the link from Loom after you stop recording.*

*When you are ready, open Loom and begin recording **both your screen and camera**, then open the medical record data entry task file attached to this e-mail and start the experimental task.*

*Thank you for your participation,*
*[Your Name]*

**EXPERIMENTAL SESSION 1 SCRIPT (PIECE-RATE PAY GROUP)**

Send the following text in an e-mail to the participant, with the subject line "Medical Record Data Entry Task – Session 2, Participant #[###]" (replacing [###] with the participant's number), and with the "Medical Record Data Entry Task – Session 2" Excel file attached to the e-mail.

*Hello [Participant's Name],*

*During your previous session, you completed [###] correct records and will be receiving $[#.##].*

*The medical record data entry task for your second session is attached to this e-mail. Please read the following before you begin your session:*

*The goals for this session and all following sessions are below:*
*Level 1: Correctly complete 190 records to earn $5.70*
*Level 2: Correctly complete 250 records to earn $7.50*
*Level 3: Correctly complete 310 records to earn $9.30*
*Level 4: Correctly complete 360 records to earn $10.80*
*Level 5: Correctly complete 410 records to earn $12.30*

*As a reminder, you may minimize the data entry task, but under no circumstances should you close the program or open another Excel file. If you do, you will have to begin the session over again.*

*The recording of your session may or may not be viewed afterward, and your performance is monitored by the experimental task. After you start the medical entry task, remember that you can always see how many records you have completed correctly by clicking the "Show Progress" button. Once the 45 minutes are up and the task automatically ends, please follow the instructions provided within the task window. Then, attach the newly-saved task file to an e-mail addressed to alejandro.ramos@wmich.edu. Also remember to share the link from Loom after you stop recording.*

*When you are ready, open Loom and begin recording* ***both your screen and camera****, then open the medical record data entry task file attached to this e-mail and start the experimental task.*

*Thank you for your participation,*
*[Your Name]*

**EXPERIMENTAL SESSION 1 SCRIPT (BONUS PAY GROUP)**

Send the following text in an e-mail to the participant, with the subject line "Medical Record Data Entry Task – Session 2, Participant #[###]" (replacing [###] with the participant's number), and with the "Medical Record Data Entry Task – Session 2" Excel file attached to the e-mail.

*Hello [Participant's Name],*

*During your previous session, you completed [###] correct records and will be receiving $[#.##].*

*The medical record data entry task for your second session is attached to this e-mail. Please read the following before you begin your session:*

*The goals for this session and all following sessions are below:*
*Level 1: Correctly complete 190 records to earn $6.30*
*Level 2: Correctly complete 250 records to earn $7.80*
*Level 3: Correctly complete 310 records to earn $9.30*
*Level 4: Correctly complete 360 records to earn $10.80*
*Level 5: Correctly complete 410 records to earn $12.30*

*As a reminder, you may minimize the data entry task, but under no circumstances should you close the program or open another Excel file. If you do, you will have to begin the session over again.*

*The recording of your session may or may not be viewed afterward, and your performance is monitored by the experimental task. After you start the medical entry task, remember that you can always see how many records you have completed correctly by clicking the "Show Progress" button. Once the 45 minutes are up and the task automatically ends, please follow the instructions provided within the task window. Then, attach the newly-saved task file to an e-mail addressed to alejandro.ramos@wmich.edu. Also remember to share the link from Loom after you stop recording.*

*When you are ready, open Loom and begin recording **both your screen and camera**, then open the medical record data entry task file attached to this e-mail and start the experimental task.*

*Thank you for your participation,*
*[Your Name]*

**EXPERIMENTAL SESSIONS 2 – 4 (FIXED PAY GROUP)**

Send the following text in an e-mail to the participant, with the subject line "Medical Record Data Entry Task – Session [3/4/5], Participant #[###]" (replacing [###] with the participant's number), and with the "Medical Record Data Entry Task – Session #" Excel file attached to the e-mail.

*Hello [Participant's Name],*

*During your previous session, you completed [###] correct records and will be receiving $[#.##] for that session, resulting in a total of $[##.##] for the study to date.*

*The medical record data entry task for your [third/fourth/fifth] session is attached to this e-mail. Please read the following before you begin your session:*

*The goals for this session and all following sessions are below:*

*Level 1: Correctly complete 190 records*
*Level 2: Correctly complete 250 records*
*Level 3: Correctly complete 310 records*
*Level 4: Correctly complete 360 records*
*Level 5: Correctly complete 410 records*

*As a reminder, you may minimize the data entry task, but under no circumstances should you close the program or open another Excel file. If you do, you will have to begin the session over again.*

*The recording of your session may or may not be viewed afterward, and your performance is monitored by the experimental task. After you start the medical entry task, remember that you can always see how many records you have completed correctly by clicking the "Show Progress" button. Once the 45 minutes are up and the task automatically ends, please follow the instructions provided within the task window. Then, attach the newly-saved task file to an e-mail addressed to alejandro.ramos@wmich.edu. Also remember to share the link from Loom after you stop recording.*

*When you are ready, open Loom and begin recording* ***both your screen and camera****, then open the medical record data entry task file attached to this e-mail and start the experimental task.*

*Thank you for your participation,*
*[Your Name]*

**EXPERIMENTAL SESSIONS 2 – 4 (PIECE-RATE PAY GROUP)**

Send the following text in an e-mail to the participant, with the subject line "Medical Record Data Entry Task – Session [3/4/5], Participant #[###]" (replacing [###] with the participant's number), and with the "Medical Record Data Entry Task – Session #" Excel file attached to the e-mail.

*Hello [Participant's Name],*

*During your previous session, you completed [###] correct records and will be receiving $[#.##] for that session, resulting in a total of $[##.##] for the study to date.*

*The medical record data entry task for your [third/fourth/fifth] session is attached to this e-mail. Please read the following before you begin your session:*

*The goals for this session and all following sessions are below:*

*Level 1: Correctly complete 190 records to earn $5.70*
*Level 2: Correctly complete 250 records to earn $7.50*
*Level 3: Correctly complete 310 records to earn $9.30*
*Level 4: Correctly complete 360 records to earn $10.80*
*Level 5: Correctly complete 410 records to earn $12.30*

*As a reminder, you may minimize the data entry task, but under no circumstances should you close the program or open another Excel file. If you do, you will have to begin the session over again.*

*The recording of your session may or may not be viewed afterward, and your performance is monitored by the experimental task. After you start the medical entry task, remember that you can always see how many records you have completed correctly by clicking the "Show Progress" button. Once the 45 minutes are up and the task automatically ends, please follow the instructions provided within the task window. Then, attach the newly-saved task file to an e-mail addressed to alejandro.ramos@wmich.edu. Also remember to share the link from Loom after you stop recording.*

*When you are ready, open Loom and begin recording* ***both your screen and camera****, then open the medical record data entry task file attached to this e-mail and start the experimental task.*

*Thank you for your participation,*
*[Your Name]*

**EXPERIMENTAL SESSIONS 2 – 4 (BONUS PAY GROUP)**

Send the following text in an e-mail to the participant, with the subject line "Medical Record Data Entry Task – Session [3/4/5], Participant #[###]" (replacing [###] with the participant's number), and with the "Medical Record Data Entry Task – Session #" Excel file attached to the e-mail.

*Hello [Participant's Name],*

*During your previous session, you completed [###] correct records and will be receiving $[#.##] for that session, resulting in a total of $[##.##] for the study to date.*

*The medical record data entry task for your [third/fourth/fifth] session is attached to this e-mail. Please read the following before you begin your session:*

*The goals for this session and all following sessions are below:*

*Level 1: Correctly complete 190 records to earn $6.30*
*Level 2: Correctly complete 250 records to earn $7.80*
*Level 3: Correctly complete 310 records to earn $9.30*
*Level 4: Correctly complete 360 records to earn $10.80*
*Level 5: Correctly complete 410 records to earn $12.30*

*As a reminder, you may minimize the data entry task, but under no circumstances should you close the program or open another Excel file. If you do, you will have to begin the session over again.*

*The recording of your session may or may not be viewed afterward, and your performance is monitored by the experimental task. After you start the medical entry task, remember that you can always see how many records you have completed correctly by clicking the "Show Progress" button. Once the 45 minutes are up and the task automatically ends, please follow the instructions provided within the task window. Then, attach the newly-saved task file to an e-mail addressed to alejandro.ramos@wmich.edu. Also remember to share the link from Loom after you stop recording.*

*When you are ready, open Loom and begin recording* ***both your screen and camera****, then open the medical record data entry task file attached to this e-mail and start the experimental task.*

*Thank you for your participation,*
*[Your Name]*

**EXPERIMENTAL SESSION 5 (FINAL; FIXED PAY GROUP)**

Send the following text in an e-mail to the participant, with the subject line "Medical Record Data Entry Task – Final Session, Participant #[###]" (replacing [###] with the participant's number), and with the "Medical Record Data Entry Task – Session 6" Excel file attached to the e-mail.

*Hello [Participant's Name],*

*This will be your final session. After you submit the items to the researcher via e-mail, the researcher will be in contact with you to schedule the debriefing. During that meeting, the researcher will provide you with information about the study, answer questions you have, and provide you with your payment for participation.*

*During your previous session, you completed [###] correct records and will be receiving $[#.##] for that session, resulting in a total of $[##.##] for the study to date.*

*The medical record data entry task for your final session is attached to this e-mail. Please read the following before you begin your session:*

*The goals for this session and all following sessions are below:*

*Level 1: Correctly complete 190 records*
*Level 2: Correctly complete 250 records*
*Level 3: Correctly complete 310 records*
*Level 4: Correctly complete 360 records*
*Level 5: Correctly complete 410 records*

*As a reminder, you may minimize the data entry task, but under no circumstances should you close the program or open another Excel file. If you do, you will have to begin the session over again.*

*The recording of your session may or may not be viewed afterward, and your performance is monitored by the experimental task. After you start the medical entry task, remember that you can always see how many records you have completed correctly by clicking the "Show Progress" button. Once the 45 minutes are up and the task automatically ends, please follow the instructions provided within the task window. Then, attach the newly-saved task file to an e-mail addressed to alejandro.ramos@wmich.edu. Also remember to share the link from Loom after you stop recording.*

*When you are ready, open Loom and begin recording* ***both your screen and camera****, then open the medical record data entry task file attached to this e-mail and start the experimental task.*

*Thank you for your participation,*
*[Your Name]*

**EXPERIMENTAL SESSION 5 (FINAL; PIECE-RATE PAY GROUP)**

Send the following text in an e-mail to the participant, with the subject line "Medical Record Data Entry Task – Final Session, Participant #[###]" (replacing [###] with the participant's number), and with the "Medical Record Data Entry Task – Session 6" Excel file attached to the e-mail.

*Hello [Participant's Name],*

*This will be your final session. After you submit the items to the researcher via e-mail, the researcher will be in contact with you to schedule the debriefing. During that meeting, the researcher will provide you with information about the study, answer questions you have, and provide you with your payment for participation.*

*During your previous session, you completed [###] correct records and will be receiving $[#.##] for that session, resulting in a total of $[##.##] for the study to date.*

*The medical record data entry task for your final session is attached to this e-mail. Please read the following before you begin your session:*

*The goals for this session and all following sessions are below:*
*Level 1: Correctly complete 190 records to earn $5.70*
*Level 2: Correctly complete 250 records to earn $7.50*
*Level 3: Correctly complete 310 records to earn $9.30*
*Level 4: Correctly complete 360 records to earn $10.80*
*Level 5: Correctly complete 410 records to earn $12.30*

*As a reminder, you may minimize the data entry task, but under no circumstances should you close the program or open another Excel file. If you do, you will have to begin the session over again.*

*The recording of your session may or may not be viewed afterward, and your performance is monitored by the experimental task. After you start the medical entry task, remember that you can always see how many records you have completed correctly by clicking the "Show Progress" button. Once the 45 minutes are up and the task automatically ends, please follow the instructions provided within the task window. Then, attach the newly-saved task file to an e-mail addressed to alejandro.ramos@wmich.edu. Also remember to share the link from Loom after you stop recording.*

*When you are ready, open Loom and begin recording* ***both your screen and camera****, then open the medical record data entry task file attached to this e-mail and start the experimental task.*

*Thank you for your participation,*
*[Your Name]*

**EXPERIMENTAL SESSION 5 (FINAL; BONUS PAY GROUP)**

Send the following text in an e-mail to the participant, with the subject line "Medical Record Data Entry Task – Final Session, Participant #[###]" (replacing [###] with the participant's number), and with the "Medical Record Data Entry Task – Session 6" Excel file attached to the e-mail.

*Hello [Participant's Name],*

*This will be your final session. After you submit the items to the researcher via e-mail, the researcher will be in contact with you to schedule the debriefing. During that meeting, the researcher will provide you with information about the study, answer questions you have, and provide you with your payment for participation.*

*During your previous session, you completed [###] correct records and will be receiving $[#.##] for that session, resulting in a total of $[##.##] for the study to date.*

*The medical record data entry task for your final session is attached to this e-mail. Please read the following before you begin your session:*

*The goals for this session and all following sessions are below:*
*Level 1: Correctly complete 190 records to earn $6.30*
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*As a reminder, you may minimize the data entry task, but under no circumstances should you close the program or open another Excel file. If you do, you will have to begin the session over again.*

*The recording of your session may or may not be viewed afterward, and your performance is monitored by the experimental task. After you start the medical entry task, remember that you can always see how many records you have completed correctly by clicking the "Show Progress" button. Once the 45 minutes are up and the task automatically ends, please follow the instructions provided within the task window. Then, attach the newly-saved task file to an e-mail addressed to alejandro.ramos@wmich.edu. Also remember to share the link from Loom after you stop recording.*

*When you are ready, open Loom and begin recording* ***both your screen and camera****, then open the medical record data entry task file attached to this e-mail and start the experimental task.*

*Thank you for your participation,*
*[Your Name]*

Appendix K

Stress/Satisfaction Questionnaire

Participant Number

How satisfied were you with the pay system?

- Completely satisfied
- Somewhat satisfied
- Neither satisfied nor dissatisfied
- Somewhat dissatisfied
- Completely dissatisfied

How stressful did you find the pay system to be?

- Not at all stressful
- A little stressful
- Somewhat stressful
- Very stressful
- Extremely stressful

How stressful did you find the goals to be?

- Not at all stressful
- A little stressful
- Somewhat stressful
- Very stressful
- Extremely stressful

What motivated you to perform the experimental task?

Throughout the sessions, did you make any sort of statements to yourself about your progress and performance?

Appendix L

Debriefing Script

**DEBRIEFING SCRIPT**

Forty-eight hours before meeting with the participant for their debriefing session, send them the below text in an e-mail. Also send the participant a separate 30-minute WebEx meeting invitation scheduled at the agreed-upon time for the debriefing session meeting.

> *Hello [Participant's Name],*
>
> *Thank you for your participation in our research study.*
>
> ***Before*** *you meet with the researcher via WebEx for debriefing, please complete the stress and satisfaction questionnaire by visiting the following link:* *https://qfreeaccountssjc1.az1.qualtrics.com/jfe/form/SV_d1rqeX1Skwpv1yt*
>
> *You will receive a separate e-mail for a WebEx meeting invitation scheduled for the time we discussed. When that time comes, please click on the link within that e-mail to open up and begin the meeting with me.*
>
> *If you have any questions between now and then, please don't hesitate to ask.*
>
> *I look forward to meeting with you,*
>
> *[Your Name]*

At the start of your WebEx meeting with the participant, please ensure that they filled out the Qualtrics stress and satisfaction questionnaire. Then, proceed with the following scripts and steps.

> *"Thank you for participating in this study. Before I explain the purpose of the study, let's discuss your final receipt and pay. You completed six sessions and earned $##.##. How would you like to be paid? We can pay you via Venmo, a cash transfer application, or by cash directly. However, be aware that if you elect to paid in cash, we will have to schedule a day and time to meet on campus to make the exchange.*

If the participant elects Venmo, acquire their account name and perform the transfer, paying them for the entire study. If they elect cash, then determine a time to meet with them on campus and schedule it using the calendar and their WMU e-mail account, so that they, too, have the meeting on their calendar. Then, continue with the following:

> *Do you have any questions about your performance during the study? [Answer any questions.]*
>
> *The purpose of this study was to compare the effects of fixed pay, piece-rate pay, and bonus pay when individuals are given tiered performance goals. You were one of the participants who received [fixed/piece-rate/bonus pay]. We allowed flexibility with how you spent your time at the computer during the session because we believe that without*

*interesting alternative things to do, individuals might work on the task the entire session, regardless of how they are paid. Do you have any questions about the study? [Answer any questions.]*

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