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Social Comparison Feedback and Goal-Setting under Fixed Pay and Incentive Pay

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by

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The purpose of the study was to compare the effects of graphic social comparison feedback (SCF) with tiered goals under both fixed pay and incentive pay. Graphic SCF that displays the individual performance of each group member was found to be the most effective type of graphic feedback in two relatively recent studies (Einarsson, 2016; VanStelle, 2012). The effectiveness of SCF may be due to the fact that the performances of peers serve as sub-goals for each individual, essentially setting up individualized ability-based goals. Currently, it is unclear whether the normative component of SCF contributes to its effectiveness. Rather, similar effects might occur when individuals are given non-normative tiered goals and provided with private, individualized feedback. A 2 x 2 factorial design was used with the following four experimental conditions: (a) goal-setting with fixed pay, (b) goal-setting with incentive pay, (c) SCF with fixed pay, and (d) SCF with incentive pay. Results were based on 64 undergraduate student participants who were randomly assigned to each experimental condition. Each attended a covariate session and three experimental sessions. Sessions were 45 minutes. Participants performed a computerized task that simulates the job of a data entry clerk. The main dependent variable was the number of correctly completed records. A two-factor ANCOVA was used to analyze the differences among the groups. Statistically significant differences were found on

factor A and B. The incentive pay conditions performed significantly better than the fixed pay conditions and the SCF conditions performed significantly better than the goal-setting conditions. No significant interaction effect was detected. This study contributed to the feedback literature by comparing the effects of two types of graphic feedback: graphic feedback based on normative standards and graphic feedback based on goals. The component analysis showed that these two types of feedback, although structurally similar, can affect performance differently. In turn, this suggests that the underlying behavioral mechanisms of the two types of feedback are different.

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INTRODUCTION

Feedback is the most popular intervention in organizational behavior management (OBM). In three decades between 1977 and 2009, 65% - 71% of studies published in the *Journal of Organizational Behavior Management* (*JOBM*) included feedback as an intervention, alone or in combination with other variables (Balcazar, Shupert, Daniels, Mawhinney, & Hopkins, 1989; Nolan, Jarema, & Austin, 1999; VanStelle et al., 2012). Part of its popularity may stem from the fact that feedback, which can significantly improve performance, is not a costly performance improvement solution in comparison to other interventions (Prue & Fairbank, 1981). Also, because the process of collecting data on performance is the foundation of most performance improvement interventions, it does not require much additional effort to make those data available to employees.

Feedback has been, and continues to be, defined in many different ways (Alvero, Bucklin, & Austin, 2001; Houmanfar, 2013). Prue and Fairbank (1981), in one of the first reviews of feedback in OBM, defined it as providing information to an individual or group about performance as it relates to either quality or quantity. Sulzer-Azaroff and Mayer (1991) defined it as information communicated back to the performer after a particular performance. More recently, Daniels and Bailey (2014) defined feedback as "information about performance that allows a person to change his/her behavior" (p. 171). Regardless of the formal definition, the purpose of feedback is to refine and improve performance by giving workers information about past performance. This purpose corresponds with the meaning of the word "feedback", as it was

originally used in engineering and cybernetics for machine-based systems (Duncan & Bruwelheide, 1985-1986; Peterson, 1982).

Over the years, many behavior analysts have discussed the possible behavioral functions that feedback might serve (Alvero et al., 2001; Balcazar, Hopkins, & Suarez, 1985-1986; Duncan & Bruwelheide, 1985-1986; Ford, 1980; Mangiapanello & Hemmes, 2015; Peterson, 1982; Prue & Fairbank, 1981). Feedback has been conceptualized as a conditioned reinforcer (e.g., Komaki, Barwick, & Scott, 1978; Panyan, Boozer & Morris, 1970) a discriminative stimulus (e.g., Balcazar et al., 1985-1986; Daniels & Bailey, 2014), rule-governed analogies of a conditioned reinforcer and a discriminative stimulus (e.g., Agnew & Redmon, 1992; Malott, 1993), and a motivating operation (e.g., Agnew, 1998; Duncan & Bruwelheide, 1985-1986). In general critiques of feedback, authors have recognized that feedback, as a physical stimulus, could have some or all of the aforementioned behavioral functions depending upon the situation (e.g., Duncan & Bruwelheide, 1985-1986; Mangiapanello & Hemmes, 2015; Peterson, 1982; Prue & Fairbank, 1981).

There are a number of reasons why it is difficult to identify the behavioral function of feedback. First and foremost, feedback applications differ considerably from one setting to another, which makes comparisons and general conclusions problematic. Additionally, in ongoing management systems (a) feedback both precedes and follows the targeted performance; (b) organizational contingencies that may influence the effects of feedback are complex and often not specified; and (c) the conditioning histories of employees, particularly within the organization, are not known. Today, as in the past, analyses of the behavioral function of feedback remain highly speculative, even in specific situations.

Despite difficulties in identifying the behavioral function of feedback, OBM professionals have attempted to determine the features of feedback that make it effective. Ford (1980) identified and classified feedback applications along several dimensions in order to systematize and thus lead to greater understanding of "…this cumbersome and disorganized aggregation of methods and procedures" (p. 183). Prue and Fairbank expanded the classification system in their 1981 review. Subsequent to that, Balcazar et al. (1985-1986) evaluated the effectiveness of feedback applications by dimension. The review, which included applied studies published in four major journals over a 10-year period, reported the percentage of applications with particular dimensions that had consistent, mixed, or no effects on performance. Alvero et al. (2001) replicated this review for applied studies published in the same journals between 1985 and 1998.

These structural reviews have been helpful in identifying some of the important dimensions of feedback applications and have helped guide researchers and practitioners. However, both Balcazar et al. (1985-1986) and Alvero et al. (2001) found that most feedback applications were used along with other independent variables. This is understandable, especially in organizational settings where it is vital to solve problems as quickly as possible, but this practice limits the extent to which intervention effects can be attributed to feedback and, therefore, to a specific feedback dimension. By aggregating feedback dimensions from different studies into the same feedback categories, the structural reviews may end up attributing positive effects to the feedback dimension, although the actual effects may have been due to other variables. Additionally, when VanStelle (2012) reexamined the studies included in Alvero et al., she found that 84% of the feedback-alone studies used multiple types of feedback. Again, in

structural reviews, positive effects may be erroneously attributed to one feedback dimension when, in fact, they were due to other dimensions or to the particular combination of dimensions.

The above problems are illustrated by graphic feedback, one of the categories in Balcazar et al. (1985-1986) and Alvero et al. (2001) for how feedback is presented. This category includes feedback applications with different content dimensions (i.e., performance information about individuals, groups, or both), privacy dimensions (i.e., performance information given privately or publicly to performers), and frequency dimensions (i.e., performance information provided daily, weekly, or monthly). General conclusions about the effectiveness of graphic feedback in comparison to other ways to present feedback (i.e., vocally, written, or mechanically) are, thus, based on graphic feedback applications that differ along several other dimensions. Yet, experimental component analyses have shown that some of these other dimensions affect performance very differently when graphic feedback is used (Einarsson, 2016; Goltz, Citera, Jensen, Favero, & Komaki, 1989; Ludwig, Geller, & Clarke, 2010; Newby & Robinson, 1983; So, Lee, & Oah, 2013; Vanstelle, 2012). For example, recently, VanStelle (2012) and Einarsson (2016) found that workers performed significantly better when they received some type of graphic social comparison feedback along with graphic individual feedback in comparison to those who received only graphic individual feedback. Ultimately, only systematic experimental comparisons like those referenced above can determine the relative effectiveness of various feedback dimensions.

Social Comparison Feedback

Social comparison feedback is one of the feedback dimensions that Balcazar et al. (1985-1986) and Alvero et al. (2001) included in the feedback content category. Feedback content refers to the type of information provided to the performer (i.e., individual, group, individual and

group, etc.). “Social comparison feedback” has been broadly defined as a display of an individual’s or group’s performance in comparison to the performance of other individuals or groups (Williams & Geller, 2000).

The current study will examine one type of social comparison feedback, the graphic display of an individual’s performance along with the individual performance of peers. A few different names have been used for this feedback procedure. It has been called public feedback (Stephens & Ludwig, 2005), public individualized feedback (Ludwig & Geller, 2000; Ludwig et al., 2010), normative feedback (Bateman & Ludwig, 2004), and public normative feedback (Camden, Price, & Ludwig, 2011). Because this is the only type of social comparison feedback that will be examined in the current study, it will be referred to simply as social comparison feedback (SCF), and the literature review will be restricted to this type of SCF.

Social comparison feedback has been used in OBM interventions for over 45 years to improve performance in various settings, such as human service agencies (Greene, Willis, Levy, & Bailey, 1978; Kreitner, Reif, & Morris, 1977; Panyan et al., 1970; Welsch, Ludwig, Radiker, & Krapfl, 1973), pizza delivery stores (Ludwig, Biggs, Wagner, & Geller, 2002; Ludwig et al., 2010), retail stores (Camden et al., 2011; Newby & Robinson, 1983), a manufacturing firm (Wikoff, Anderson, & Crowell, 1982), a real-estate brokerage (Anderson, Crowell, Sucec, Gilligan, & Wikoff, 1983), a bar (Anderson, Crowell, Hantula, & Siroky, 1988) a hotel (Anderson, Crowell, Sponsel, Clarke, & Brence, 1983), a distribution warehouse (Bateman & Ludwig, 2004), a swim club (McKenzie & Rushall, 1974), and a hospital (Stephens & Ludwig, 2005). Despite the use of SCF over the years, studies examining its relative effectiveness in comparison to other feedback applications are rare. A review of the literature revealed only five studies that have compared SCF to other types of feedback interventions.

Two studies compared publicly posted SCF with publicly posted group performance feedback (Ludwig et al., 2010; Newby & Robinson, 1983) and one compared privately presented SCF with privately presented group performance feedback (Goltz et al., 1989). All three found SCF to be more effective than displays of group performance. Although the results of these studies are informative, it is not clear whether they are due to the display of the normative data of peers or simply to the display of the individual's own performance (which is part of the normative display). The remaining two studies, VanStelle (2012) and Einarsson (2016), compared SCF to other individual feedback applications, controlling for this potential confound.

VanStelle (2012), in a laboratory simulation, compared the effects of three types of graphic feedback when individuals received fixed pay, using a between-group design with 54 participants. Each participant completed five 30-minute sessions. The task was a computerized medical data entry task and the primary dependent variable was the number of correctly entered medical records. Participants received graphic feedback that displayed (a) only their own performance, (b) their own performance along with the group's average performance, or (c) their own performance along with the performance of everyone else in the group, identified by name. Across the five sessions, performance increased by 14%, 21%, and 31%, respectively, for the three groups identified above. An ordered treatment monotone ANCOVA confirmed significant performance differences ($p < 0.05$) between the groups in the predicted order: Participants who received the display depicting the individual performance of their peers along with their own performance performed the best, followed by those who received the display depicting the group's average performance along with their own performance, followed by those who received the display depicting only their own performance.

In an extension of VanStelle's (2012) study, Einarsson (2016) compared the effectiveness of graphic individual feedback and graphic SCF when individuals received piece-rate pay, using a between-group design with 80 participants. Each participant completed five 45-minute sessions. Einarsson used the same medical data entry task as VanStelle and the same primary dependent variable, the number of correctly completed medical records. Participants were randomly assigned to one of the following three groups: (a) no feedback, (b) graphic individual feedback, or (c) graphic SCF. Across the five sessions, performance increased by 6.6%, 21.2%, and 23.7%, respectively. An ordered treatment monotone ANCOVA confirmed significant performance differences ($p < 0.01$) in the predicted order: Participants who received graphic SCF performed the best, followed by those who received graphic individual feedback, followed by those who did not receive feedback.

The results of Einarsson's (2016) study are consistent with VanStelle's (2012) results and extend them to performance when individuals are paid monetary incentives. The data from the two studies indicate that both graphic individual feedback and SCF improve performance under hourly and incentive pay conditions. Together, they also indicate that graphic SCF results in higher levels of performance than either graphic individual feedback (Einarsson, 2016; VanStelle, 2012) or graphic individual feedback displayed along with the group's average performance (VanStelle, 2012). It should be noted, however, that in Einarsson's study, the incentive pay appears to have attenuated the performance differences between the SCF and individual feedback groups. In VanStelle's study, when participants received fixed pay, the SCF group performed 18% better than the individual feedback group, whereas in Einarsson's study, the SCF group performed only 7% better.

Johnson's (2013) component analysis of objective and evaluative feedback may serve a crucial role in understanding why SCF resulted in better performance than the other types of feedback examined by VanStelle (2012) and Einarsson (2016). Objective feedback can be defined as measureable, factual data about performance that does not indicate and/or is not related to how well an individual is performing (Einarsson, 2016). For example, a manager could tell an employee, "you produced 20 parts yesterday" or "your total sales was $1,000 yesterday". Historically, this type of feedback has been referred to as "knowledge of results" (Annett, 1969; Ilgen, Fisher, & Taylor, 1979). Evaluative feedback, on the other hand, indicates how well the individual is performing in comparison to some metric, such as a performance standard, a goal, or the performance of others, and is usually accompanied by praise or criticism (Einarsson, 2016). For example, a manager could tell an employee, "you performed above average yesterday, great!" or "you were one of our top salespeople yesterday, keep it up!".

It should be noted that some authors have emphasized that in order for information to qualify as feedback, it must contain sufficient information to enable performers to adjust or improve their performance (Brethower, 1972; Goodman, Wood, & Hendrickx, 2004; Rummler & Brache, 1995). Others, however, have not restricted the definition of feedback to its effects on subsequent performance. For example, the definitions by Sulzer-Azaroff and Mayer (1991) and Prue and Fairbank (1981) presented earlier state only that feedback is information given to the performer about past performance. If one adopts the perspective that feedback must enable performers to improve their performance, it could be argued that neither objective feedback nor some forms of evaluative feedback are, in fact, "feedback". With respect to objective feedback as defined above, informing performers that they produced 20 parts yesterday does not tell performers what they need to do in order to produce more parts in the future. Similarly,

informing performers that they performed above average, average, or below average—evaluative feedback as defined above—does not tell performers what they need to do in order to perform better in the future either. Yet, both types of feedback have improved performance in many, albeit certainly not all, laboratory and applied studies (Crowell et al., 1988; Gaetani, Hoxeng, & Austin, 1985; Parsons, 1974). The factors that influence the effectiveness of different types of feedback, such as the complexity of the task and the performer's level of expertise, are not, as yet, known. Regardless, individuals who have reviewed the effects of feedback have repeatedly maintained that the consistency and size of the effects depend, in part, on the extent to which it permits the performer to assess his or her own performance (Annett, 1969; Ilgen et al., 1979; Kopelman, 1986; Prue & Fairbank, 1981). Johnson (2013), however, only recently provided a clear demonstration of the relative effects of objective, evaluative, and combined objective and evaluative feedback.

Johnson's (2013) study, conducted in the laboratory, was a between-group study with the following four conditions: (a) no feedback, (b) objective feedback, (c) evaluative feedback, and (d) combined objective and evaluative feedback. Using the performance of participants in the no feedback group as the control, Johnson found that performance improved by 17% when participants received either objective or evaluative feedback, but improved by 30% when participants received both objective and evaluative feedback.

All of the feedback conditions in VanStelle (2012) and Einarsson (2016) provided the same objective feedback to performers (i.e., how many medical records they had correctly completed). However, the conditions varied greatly with respect to the amount of evaluative feedback that was available. In VanStelle, the group's average performance provided a metric against which performers could assess their performance and is probably why participants in that

condition outperformed participants who received feedback only on their own performance. Social comparison feedback provides additional metrics: It sets the boundaries for high and low performance and displays the relative standing of the performer within the group. This additional evaluative information probably explains why both VanStelle's and Einarsson's SCF participants performed better than those who were given only individual feedback (Einarsson, 2016; VanStelle, 2012) and, in addition, why VanStelle's SCF participants performed better than those who were given the group's average performance.

Based on analyses by Guerin (1993, 1994) and McGinnies (1970), Einarsson (2016) speculated that the evaluative ranking information provided by SCF affects performance because individuals typically have an extensive history in which performing well in a group is reinforced and performing poorly is punished. Further, in competitive group and team situations, often only those that excel are rewarded. In Olympic sports, for example, only the three top performers receive medals and in business and industry, only the top employees become the employee-of-the-month. Peers typically provide differential social consequences for good and bad performance in groups and teams as well: Good performers are lauded and rewarded by peers; poor performers are criticized and may even be ridiculed and ostracized. This history of reinforcement is likely to generalize to new settings, making ranks closer to the top reinforcing and ranks closer to the bottom aversive.

Guerin (1993, 1994) argued that many people have a stronger history of being punished or criticized for their performance rather than being rewarded for it. According to this perspective, then, the avoidance of low or comparatively lower rankings and anticipated aversive consequences may primarily control behavior, particularly when relative rankings are known and distributed to all group members.

Einarsson (2016) also suggested that with SCF, the individual performances of the other performers (and their rankings) might, essentially, function as multiple sub-goals, establishing individualized, achievable goals for each performer. For example, the eighth ranked performer may need to increase his or her performance by 200 widgets to match the performance of the top performer, which might not be achievable. However, a more incremental increase in performance is attainable. If the performer produces 15 more widgets and advances from his or her rank from eighth to seventh, then the sixth rank may be within an attainable range. That is, each successively higher rank could serve as a sub-goal, evoking behavior that progresses the individual toward that sub-goal, with progression to the top and/or avoidance of lower rankings serving as generalized reinforcers.

If, as speculated earlier, a long history of differential consequences based on relative group rankings has made low ranks aversive and high ranks reinforcing, then the difference between a currently held rank and superior ranks would be likely to function as a reflexive motivating operation (Michael, 2004, 2007). As a reflexive motivating operation, the difference between the current rank and the superior rank would make a decrease in the difference reinforcing and evoke behaviors that would decrease the difference. The performance of top performers could also be controlled by positive and/or aversive contingencies relating to past consequences. Specifically, being at the top or close to the top could serve as a reinforcer, with the loss or potential loss of one of the top spots functioning as a direct or verbally-mediated negative reinforcer, sustaining high levels of performance. Given the above analysis of SCF in terms of goals and the main purpose of the current study, which is to compare the relative effects of SCF and multiple tiered goals (with feedback), a behavioral analysis of goals will be considered next.

Goal-setting

Although not as popular as feedback, goal-setting has also been shown to be an effective way to increase performance. It has been used as a performance management procedure for about 100 years, and more than 1,000 studies have examined its effectiveness (Bryan & Harter, 1897; Locke, 1968; Locke & Latham, 2013; Roose & Williams, 2018; Taylor, 1911). Within OBM, 20% to 30% of the research studies published in *JOBM* between 1977 and 2009 used goal-setting as an independent variable (Balcazar et al., 1989; Nolan et al., 1999; VanStelle et al., 2012). VanStelle et al. (2012), in the most recent review of articles published in *JOBM*, found that it was the fourth most popular intervention, after feedback, antecedents, and training, during 1998 – 2009. Unfortunately, like feedback, goals are rarely implemented alone, which makes a specific analysis of the behavioral function of goals difficult. Despite this, the possible behavioral functions of goals, again like feedback, have been discussed for years.

Fellner and Sulzer-Azaroff (1984) proposed that goals can function as discriminative stimuli when they are correlated with reinforcement for goal-directed behavior. As such, they would directly evoke goal-directed behavior when presented. Once evoked, goal-directed behavior is maintained by rewards for goal attainment, such as praise, preferred assignments, extra time-off, and monetary incentives. Then, after repeatedly being paired with reinforcers, goal attainment can become a conditioned reinforcer. Fellner and Sulzer-Azaroff further proposed that the goal itself could become a conditioned reinforcer for goal-directed behavior when goal attainment is paired with rewards. However, this part of the analysis is problematic, because the goal necessarily has to come before the goal-directed behavior, not after it, in order to evoke it. The goal itself, however, might reinforce behaviors that precede it, such as reading a

memo from management about what the goal is or looking at a chart or graph on the wall that visually depicts the goal.

Agnew (1998) discussed goals in terms of motivating operations (Michael, 2004, 2007), proposing that goals increase the reinforcing value of consequences associated with goal-directed behavior and directly evoke goal-directed behavior because that behavior has been followed by those consequences in the past. Similar to Fellner and Sulzer-Azaroff (1984), Agnew also maintained that goals could have different behavioral functions in different settings and could also have multiple functions. That is, a goal could function as a discriminative stimulus, a motivating operation, and/or a conditioned reinforcer.

According to a molecular perspective, however, in order to function as a direct-acting discriminative stimulus or conditioned reinforcer, a goal would have to evoke or follow a behavior immediately (Malott, 1993; Michael, 2004, 2007). In most work settings, goals are presented too far before or after behavior to meet this requirement. Thus, goals have also been conceptualized as rules that specify the relation between certain behaviors and consequences (Ludwig & Geller, 2000).

Blakely and Schlinger's (1987) analysis of rule-governed behavior provides one account of how goals might affect behavior as rules. According to this analysis, rules, which they refer to as contingency-specifying stimuli in order to distinguish them from discriminative stimuli, alter the function of other stimuli in the environment. With respect to goals, for example, the supervisor's statement that a goal now exists and goal attainment will be rewarded (i.e., the rule) could change the function of other goal-related stimuli (e.g., the sight of a written goal or a goal line on a graph) from neutral stimuli to discriminative stimuli or motivating operations. The goal-related stimuli, when presented, would then evoke behavior immediately. In addition,

because the supervisor indicated that goal attainment would be rewarded, goal attainment itself could become a conditioned reinforcer.

Malott's (1993) analysis of rule-governed behavior offers an alternative explanation of how goals might affect behavior as rules. In his account, the goal would be likely to evoke a self-stated rule, such as "If I don't meet the goal, I will be criticized by my supervisor". The goal statement then functions as a conditioned motivating operation (Michael, 2004, 2007), establishing noncompliance (i.e., taking a break from work or working slowly) as a learned aversive condition. Goal-directed behavior is then evoked and reinforced by an immediate decrease in the aversiveness created by noncompliance with the rule. Each instance of the behavior would decrease the aversiveness further. Noncompliance with subsequent self-statements of the rule would continue to evoke goal-directed behavior until the goal was met.

O'Hora and Maglieri (2006) provided a third verbally-mediated analysis of goal-setting, using relational frame theory (Hayes, Barnes-Holmes, & Roche, 2001) as its foundation. From this perspective, goal-statements establish feedback as reinforcement for goal-directed behavior when the behavior decreases the discrepancy between the individual's current performance and the goal. For example, assume that a goal is set at 100 widgets per hour. At the beginning of the hour, the goal is likely to evoke a self-statement such as, "The goal is 100 widgets and I have not completed any". If, after 15 minutes, the worker receives feedback indicating that he has made 20 widgets, the feedback evokes another self-statement, i.e., "I have made 20 widgets", and functions as "derived" reinforcement because it indicates that the discrepancy between his performance and the goal has decreased. Similarly, if, after 30 minutes, the worker receives feedback indicating that he has made 50 widgets, the feedback will again evoke a self-statement about the number of widgets he has made and function as reinforcement because the difference

between the worker's current performance and goal has once again decreased. This iterative process continues until the goal is met. Additionally, according to this perspective, the reinforcement for meeting the goal also reinforces the relational responding in terms of the discrepancy (i.e., responding that is in accord with the "less than" relation between current performance and the goal). Thus, if goal attainment is not reinforced, the derived reinforcing effects of feedback will abate, decreasing future goal-directed behavior.

The above analyses by Fellner and Sulzer-Azaroff (1984), Agnew (1998), and Blakely and Schlinger (1987) emphasize the goal (or goal statement) as the primary controlling variable of goal-directed behavior. However, the latter two (Malott, 1993; O'Hora & Maglieri, 2006) suggest that the difference between the goal and the individual's current performance is the critical determinant of goal-directed behavior, not simply the goal (or goal statement) itself. That is, these analyses emphasize the importance of both the goal and the individual's current level of performance equally. Although recognizing that goals may function differently in different settings, these latter analyses are supported by research that has consistently shown that goals do not effectively control behavior in the absence of feedback (Amigo, Smith, & Ludwig, 2008; Bandura & Cervone, 1983; Erez, 1977; Locke & Latham, 1984, 1990; Ralis & O'Brien, 1987).

Even though the studies above suggest that the discrepancy between the individual's current performance and the goal is the critical determinant of goal-directed behavior, if the discrepancy is too large, goal-directed behavior may not be evoked. Traditional goal-setting theorists as well as behavior analysts have consistently stressed that a goal must be achievable in order to affect performance (Daniels & Bailey, 2014; Fellner & Sulzer-Azaroff, 1984; Locke & Latham, 2007).

Goal-setting interventions differ considerably with respect to how challenging the goal is (Daniels & Bailey, 2014; Fellner & Sulzer-Azaroff, 1984). Daniels and Bailey (2014) pointed out that it can be hard to set a goal that is challenging, yet also achievable. It can be especially difficult on a group level because performances can vary greatly among employees. Unfortunately, OBM researchers have yet to empirically determine what "a challenging, but achievable goal" is. And, while traditional goal-setting theorists have defined challenging, but achievable goals as those that 20% to 50% of individuals can achieve (Fasteas & Hirst, 1992; Jeffrey, Schulz, & Webb, 2012; Merchant & Manzoni, 1989), studies have not compared the relative effectiveness of goals that fall within that range. Further, it should be noted that if these traditional definitions are used to set goals, 50%-80% of performers would not be able to achieve the goal, which makes their designation as "achievable" questionable.

The most effective way to set goals is still being debated (Locke & Latham, 2013). Daniels and Bailey (2014) caution that a common mistake is to make goals too difficult to achieve, and urge that it is better to err on the side of making a goal too easy rather than too hard. On the other end of this spectrum are stretch goals. Stretch goals are goals that are deliberately intended to be set at a performance level that roughly only 10% of employees will be able to reach (Daniels, 2009; Jeffrey et al., 2012). The purpose of stretch goals is to motivate employees to increase performance to levels that they may not have believed possible before being given the goal.

Stretch goals have mostly been popularized by the success credited to them by a few notable companies (Kerr & Landauer, 2004; Kerr & LePelley, 2013). The positive effects of stretch goals, however, are based largely on anecdotal, uncontrolled reports (Sitkin, See, Miller, Lawless, & Carton, 2011) and are countered by experimental evidence indicating that stretch

goals are actually detrimental to performance (Chow, Lindquist, & Wu, 2001; Fisher, Peffer, & Sprinkle, 2003). Conceptually, these latter data are in line with the analyses presented earlier. If goal attainment is the performance that is rewarded and praised, then a stretch goal is unlikely to create new opportunities for managers to praise and reward performance. Accordingly, if the stretch goal evokes new or additional responses by employees, most responses will not be reinforced and are likely to extinguish (Daniels & Bailey, 2014; Fellner & Sulzer-Azaroff, 1984; O'Hora & Maglieri, 2006). Further, for the 90% of employees that never reach the goal, a constant sign of failure and underperformance is likely to have the opposite effect of what the stretch goal intended and be detrimental to employee performance (Daniels & Bailey, 2014; Locke & Latham, 1984). Locke and Latham, when discussing the adverse effects of setting unreachable goals, 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)

Tiered goals are one solution to the problem of setting achievable yet challenging goals for employees. Tiered goals are multiple concurrently available goals set at different intervals of performance. Tiered goals help to make sure that most, if not all, employees have a goal within their reach. They also make it possible to deliver differential positive consequences at each goal level. If goal achievement is consequated correctly, meeting successively higher tiered goals should increase the amount of praise and rewards received by employees, which in turn, should increase performance to even higher levels.

Daniels (Daniels & Bailey, 2014; Daniels & Rosen, 1982) and Abernathy (1996, 2013) are long-time advocates of performance management systems that are based, in part, on tiered goals. On a measurement tool that Daniels and Abernathy call the Performance Matrix or Performance Scorecard, five to seven target behaviors or results for a specific job are identified and weighted according to organizational priorities. Baseline performance measures are then determined and up to ten sub-goals covering a wide range of performance are listed for each behavior or result. The top two goals are often used to specify performance that is considered to be "above goal" or, in other words, overachievement. Differential consequences are then provided for different levels of performance.

Only two studies have attempted to examine the effects of tiered goals on performance (Sundberg, 2015; Urschel, 2015). Urschel compared the effects of tiered goals with the effects of a moderately difficult goal and a difficult goal on performance when individuals received bonus pay for goal achievement. The study was a between-group study conducted in the laboratory. The experimental task was a computerized data entry task that simulated the job of a medical data entry clerk, the same task that was used in the current study. Participants in all three groups received a $4.00 base pay for each of the five 45-minute sessions they attended. Participants in tiered goal group were given three goals simultaneously and could earn an additional $1.00 for meeting the easy goal, $2.00 for meeting the moderate goal, or $3.00 for meeting the difficult goal. Participants in the moderate goal group could earn an additional $2.00 for meeting their assigned goal and those in the difficult goal group could earn an additional $3.00 for meeting their goal. The moderate and difficult goals in the latter two conditions were the same as the moderate and difficult goals in the tiered goal condition. No significant differences were found between the three groups. Unfortunately, however, her results were inconclusive because the

goals were too easy for participants: 66% met or exceeded the difficult goal in the first session and 84% met or exceeded the difficult goal in the last session. As stated by Urschel, "Rather than easy, moderate, and difficult, the goals in the current study might be more appropriately labeled extremely easy, very easy, and easy" (p. 46).

Sundberg (2015), also in a laboratory study, investigated the effects of four different pay systems on performance when individuals were given the same five tiered goals along with graphic performance feedback, using a between-group design with 66 participants. Each participant completed five 45-minute sessions. The experimental task was a medical data entry task and the dependent variable was the number of correctly completed medical records. Participants in one group were paid a fixed amount per session. Participants in a second group received base pay and a per-piece incentive for each correctly completed record. Participants in a third group received base pay and a per-piece incentive that increased when they met each successively higher goal. Participants in the fourth group received base pay and bonus pay which, again, increased when they met each successively higher goal. No statistically significant performance differences were found between any of the groups.

The failure to find performance differences between the incentive groups and the fixed pay group is particularly interesting because of the large body of literature that shows that incentive pay typically produces significantly higher levels of performance than fixed pay (Bucklin & Dickinson, 2001; Condly, Clark, & Stolovitch, 2003; Garbers & Konradt, 2014; Jenkins, Gupta, Mitra, & Shaw, 1998; Stajkovic & Luthans, 2003). Sundberg's (2015) results may mean that tiered goals and incentives result in similar levels of performance when graphic feedback is given to workers. If that is the case, it would have very important implications for organizations. On the other hand, all of Sundberg's incentive groups performed better than the

fixed pay group and thus it is possible that there were true differences between the means that, for some unknown reason, were not detected in the study. Sundberg speculated that failure to find differences between the groups may have been due to one of the following four reasons: (a) the sample size was too small; (b) the incentive and bonus payouts were not large enough; (c) the 45-minute work sessions were not long enough; and/or (d) the extra course credit that most participants received was the primary controlling variable of their performance, not the putative independent variables. Given the preceding, additional research is warranted to determine whether tiered goals and monetary incentives have similar effects on performance.

Social Comparison Feedback and Tiered Goals

Both SCF and tiered goals (with feedback) may positively affect performance by establishing individualized, ability-based sub-goals for each individual. Thus, the behavioral mechanisms underlying the two interventions may be the same or, at least, similar. However, with SCF, the performances of peers serve as the sub-goals, which introduces a normative component that is not present with tiered goals. Normative feedback may enhance performance by increasing performer perception that the "goals" are attainable in contrast to tiered goals that may be perceived as arbitrary. That is, in the past, when given goals based on the performance of peers, performers may have been more successful in meeting them than when given other types of goals; thus peer-based goals, as antecedents, may exert more control over goal-directed behavior than other types of goals. On the other hand, tiered goals may have an advantage over SCF in that their use could avoid the potential aversiveness and punishing effects that may be associated with SCF; effects that are discussed below.

According to Camden et al. (2011), SCF is effective because it "informs employees of their performance levels, holds them publically accountable, allows employees to compare

performance with their peers... and may introduce a measure of competition with their peers" (p. 141). However, as suggested earlier, the public accountability and peer comparison may result in the aversive control of performance due to historical contingencies that are likely to have emphasized peer and supervisory criticism for poor performance rather than social approval and praise for good performance (Guerin, 1993, 1994). Further, low rankings or large discrepancies between the performance of individuals and their peers could serve to directly or indirectly punish performance and elicit negative emotional reactions. Finally, although competitiveness is not always problematic, such displays could generate detrimental, rather than positive, forms of competition (Buskist & Morgan, 1988; Prue & Fairbank, 1981). Concern for the potential aversiveness and punishing effects of the public display of individual performance has led some individuals to develop "rules of thumb" for the delivery of feedback and praise, such as "Individual feedback should be given privately; group feedback is most often posted publicly" (Daniels & Bailey, 2014, p. 165), and "Praise publicly—punish privately" (Prue & Fairbank, 1981, p. 4).

Despite the above concerns, the aversiveness of SCF has not been empirically verified. For example, in VanStelle (2012) and Einarsson (2016), participants who received SCF reported that they were comfortable with the fact that others saw their performance data. Additionally, their reported satisfaction and stress did not differ from participants who received graphic individual feedback. However, both studies were conducted in the laboratory and those results may not transfer to the workplace because participants might not have encountered some of the aversive contingencies that employees would be likely to encounter. First, participants in these studies did not typically know or interact with each other, which eliminates the possibility of social consequences from peers for performance. Second, and perhaps more importantly, the

experimenters did not provide differential consequences based on performance or ranking. In an actual work setting, supervisors would be likely to criticize workers whose performance was consistently below their peers and such criticism would be likely to increase the aversiveness of SCF. Additionally, in actual work settings, organizational rewards, such as pay raises, choice job assignments, promotions, etc., are likely to be competitive and distributed only to highly-ranked performers, which would also be likely to increase the aversiveness of SCF (Buskist & Morgan, 1988; Johnson & Dickinson, 2010).

Although the aversiveness of SCF has not yet been directly documented, data from a recent study by Moon, Lee, Lee, and Oah (2017) suggest that SCF may well be aversive for low performers, even in the absence of differential consequences from peers and supervisors. These authors examined the relative effectiveness of objective feedback and SCF on the performance of high and low performers. The study, conducted in the laboratory, was a between-group study with the following conditions: (a) high performers who were given objective feedback, (b) high performers who were given SCF, (c) low performers who were given objective feedback, and (d) low performers who were given SCF. The task was a computerized task and the dependent variable was the number of correctly completed work units. Participants in the objective feedback conditions were given written feedback on the number of work units they completed correctly. Participants in the SCF conditions were given written feedback only on their relative ranking in the group, which included both the high and low performers. The results revealed an interaction between performance level and the type of feedback. High performers performed significantly better when they received SCF than when they received objective feedback; however, low performers performed significantly better when they received objective feedback

than when they received SCF. These latter results suggest that the SCF rankings had a negative effect on performance.

Purpose of the Study

The main purpose of the current study was to compare the effects of graphic SCF with tiered goals and private graphic individualized feedback. Currently, it is unclear whether the normative component of SCF contributes to its effectiveness. Rather, similar effects may occur when individuals are given non-normative tiered goals and provided with private, individual feedback. This study contributed to the feedback literature by conducting a component analysis of the variables that make feedback effective and, specifically, whether normative standards affect performance differently than goal-setting, research advocated by Einarsson (2016) and Johnson (2013). As stated above, the results of the study also have important practical implications for organizations, given the potential aversiveness of normative SCF; aversiveness that can be avoided by the use of tiered goals and individual feedback.

The study also extended VanStelle (2012) and Einarsson (2016) by comparing the relative effects of SCF when individuals are paid hourly and when they are paid monetary incentives. Both studies found that SCF was more effective than private graphic individual feedback, but the effects of SCF may have been considerably mitigated by incentives in Einarsson's study. To review, VanStelle's SCF group performed 18% better than the individual feedback group, whereas Einarsson's SCF group performed only 7% better. As noted by Einarsson, "Companies may decide to forego a 5% - 7% performance increase in favor of a feedback system that employees may prefer, whereas they may not be willing to forego an 18% - 20% increase" (p. 47). The differences in performance enhancement (i.e., 18% versus 7%) were derived from an across-study comparison based on only two studies. A direct comparison of the

relative effects of SCF under hourly and incentive pay conditions is, thus, warranted and in keeping with Balcazar et al.'s (1985-1986) advice that because different feedback systems may have different effects depending on the reinforcement system, it is important to examine them under different systems.

Finally, this study also partially replicated Sundberg's (2015) study by examining the effects of tiered goals on performance when individuals are paid hourly and when they are paid monetary incentives. As discussed earlier, in that study, the performance of participants who were paid hourly pay was comparable to the performance of participants who were paid monetary incentives. Sundberg's results are both practically and conceptually interesting because of how unusual they are. The results of the current study help determine the validity of those findings.

METHOD

Participants

Participants were recruited from undergraduate psychology classes at Western Michigan University. Before recruitment, approval for the study was obtained from the University's Human Subjects Institutional Review Board. The approval letter is provided in Appendix A. Only individuals who signed a consent form were included in the study (see Appendices B and C for the consent forms).

Participants were recruited using an in-class recruitment script (see Appendix D) and recruitment flyers (see Appendix E). There were three requirements to qualify for the study. First, recruits that had participated in other studies using the same medical data entry program were excluded from the study because experience with the task might have affected how they responded. Second, participants were excluded if they currently had or previously had any sort of data entry job. Past studies have found that participants with data entry experience are significantly better at performing this task than naive performers, and introduce extreme variability into the dataset. Requirements for the first two criteria were assessed using a questionnaire (see Appendix F). Finally, participants had to be able to attend four 45-minute sessions.

Participants were paid either a fixed rate or monetary incentives based on their performance and were paid, in cash, after debriefing. Debriefing occurred the week after their last session. If participants dropped out before the end of the study, they were paid the amount they earned at the point of their withdrawal.

Eighty-one participants were recruited and passed inclusion criteria. Of the 81 participants in the study, 78% were female (n=60) and 22% male (n=18). Average age of participants was 19.9 years.

Setting

The experimental setting consisted of three rooms (2532, 2510, 2512) in Wood Hall, Western Michigan University. Two of the rooms, 2510 and 2512, were small rooms that were used for greeting participants, delivering feedback, and scheduling the next session. The main experimental room, 2532, was across the hall and had three cubicle workstations, sectioned off with dividers. Each workstation contained an adjustable chair, computer, keyboard, mouse, and gel palm rest.

Experimental Task and Alternative Activities

The experimental task was a computerized data entry task designed to simulate the job of a medical data entry clerk. The computer presented medical records that displayed a patient's name, ID number, date of birth, current age, gender, and medical test results. Also displayed were two boxes, one for male and one for female, indicating the range of test results that would be "within range" or normal. Participants first entered the patient's ID number into a blank "Patient ID" box. They then determined whether the patient's medical results were in or out of range and clicked the "within range" or "out of range" button. When participants clicked the "Submit" button, a new medical record was presented. A screenshot of the task can be found in Appendix G.

Participants had access to six games on the desktop (Angry Birds, Jewel Quest, Text Twist, Solitaire, Bejeweled 2, and Mahjong), the Internet, and their cell phones. They were required to mute the sounds on all devices to prevent disruptions to other participants. These off-

task activities were designed to simulate off-task activities in the work place. Without such activities, participants might have spent the entire session working on the experimental task simply because there was nothing else to do, which could have negated the effects of the independent variables. A recent survey of 1,034 employees reported that workers frequently engage in non-work activities using company computers or personal mobile devices (Carey & Trap, 2014). Specifically, 68% indicated that they checked personal e-mail daily, 52% indicated that they texted daily, 23% indicated that they played games daily, and 21% indicated that they posted to social media daily. These data support the ecological validity of the off-task activities in the current study.

Dependent Variables

The primary dependent variable was the number of correctly entered medical records per session. This variable could have been affected by three factors, which were measured as secondary dependent variables: (1) time-on-task, measured by the average amount of time the participant spent performing the task per session, (2) accuracy, measured by the average percentage of records completed correctly per session, and (3) rate, measured by the average number of records completed per minute per session when the participant was on-task. Time-off-task was defined as any pause in responding longer than 30 seconds. Time-on-task was calculated by subtracting the cumulative number of seconds off-task from the 45-minute session time. The computer program automatically collected all dependent variables. After each day, the experimenter saved the data on a password protected flash drive. This was done to prevent any loss of data due to computer malfunction.

After the last experimental session, participants were asked to complete a questionnaire about their satisfaction, stress, and performance with respect to the specific condition to which they belonged. The questionnaires can be found in Appendix H.

Independent Variables

The independent variables were the type of graphic feedback display (a display of individual performance and five goals versus a display of individual performance and the performance of five other group members) and the type of pay system (fixed pay versus incentive pay). The display of individual performance along with five goals will be referred to as the goal-setting condition and the display of individual performance and performance of five other group members will be referred to as the SCF condition. There were four experimental conditions: (a) goal-setting with fixed pay, (b) goal-setting with incentive pay, (c) SCF with fixed pay, and (d) SCF with incentive pay.

Participants in the goal-setting conditions were given five tiered goals (200, 250, 300, 350, and 400 correctly completed records). These corresponded to about the 10^{th}, 25^{th}, 50^{th}, 75^{th}, and 90^{th} percentiles of the performance of 80 undergraduate students who were participants in Einarsson (2016). Those participants performed the same experimental task and received piece-rate pay for each correctly completed record. The percentiles were based on the first three experimental sessions completed by the participants. The goals were altered slightly to make it easier for the participants to remember them.

For the SCF conditions, the performances of five participants from Einarsson (2016) were displayed on the graph along with the actual performance of the current participant. The performances of these five participants were selected for display because they most closely averaged each of the five goals (across three experimental sessions). The performances were

adjusted slightly to exactly match the corresponding goals. The participants were told that the graph displays their performance along with the performance of five other individuals in their group.

To isolate the effects of the two graphic feedback displays, no vocal evaluative feedback or within-session feedback was provided in any condition.

As indicated previously, participants either received fixed pay or incentive pay. Participants in the fixed pay conditions were paid $6.00 per session. Participants in the incentive pay conditions were paid two cents for each correctly completed record. If these participants correctly completed the average number of records, determined from previous research, they, too would have earned approximately $6.00 per session. As with the goals, average performance was calculated from the first three experimental sessions completed by Einarsson's (2016) 80 participants. The average was actually 299 correctly completed records in that study; thus, if participants had performed at the average, they would have actually earned $5.98 per session rather than $6.00 per session.

Goal-setting with fixed pay. Participants in this condition were paid $6.00 for all their sessions, independent of their performance. The instructional script can be found in Appendix I. Before each session, except the first**,** participants were shown a line graph that displayed the number of medical records they correctly completed in their previous sessions along with the performance goals. The number of correctly completed medical records and the amount that the participant earned in the preceding session were listed at the bottom of the graph and updated for each session. An example goal-setting graph can be found in Appendix J.

Goal-setting with incentive pay. Participants in this condition were paid two cents per correctly entered medical record for the three experimental sessions. The instructional script can

be found in Appendix K. Both goal-setting groups received the same type of graphic feedback (Appendix J).

Social comparison feedback with fixed pay. Participants in this condition were paid $6.00 for all their sessions, independent of their performance. The instructional script can be found in Appendix L. Before each experimental session, participants in this condition received a line graph that displayed the number of medical records that they correctly completed in their previous sessions along with the number of medical records correctly completed by each individual in their group, and their ranking within the group. The number of correctly completed medical records and the amount that the participant earned in the preceding session were listed at the bottom of the graph and updated for each session. As indicated previously the data for the other individuals were based on five of Einarsson's (2016) participants. An example of the SCF graph can be found in Appendix M. Although the graph in the appendix displays the performance of the other five group members for all four sessions, the data for the five group members were revealed session by session, as it would be in an actual applied setting. For example, when the experimenter gave the graph to participants before session 2, it only contained performance data for the five group members from session 1. Similarly, the session 3 graph only contained performance data for the first two sessions.

In an attempt to emulate the typical social contingencies associated with SCF, the performance data were identified by name. The participant's real name was displayed on the graph. The other names were fake names.

Social comparison feedback with incentive pay. Participants in this condition were paid two cents per correctly entered medical record for the three experimental sessions. The

instructional script can be found in Appendix N. Both SCF groups received the same type of feedback graph (Appendix M).

Experimental Design

A 2 x 2 factorial design was used. Participants were randomly assigned to the four conditions, and each condition had 19-22 participants. Each participant completed four 45-minute sessions, a covariate session and three experimental sessions.

Statistical Analysis

A two-factor analysis of covariance (ANCOVA) was used to analyze the differences among the groups, using the data from the first session as the covariate to control for data entry skills and the average number of correctly completed records for the three experimental sessions. Prior to running the ANCOVA, the regression slopes were tested to ensure homogeneity.

The relationships between the dependent variables (time-on-task, accuracy, and data entry rate) and average number of correctly completed medical records were calculated using Pearson product moment correlations.

After the study, participants in all conditions were asked to answer questions measuring stress, satisfaction, and doing their best to improve their performance on a scale from one to five. As mentioned earlier, the post-study questionnaires can be found in Appendix H. Differences between conditions were analyzed using ANOVAs. In addition, participants in the SCF conditions were asked to indicate the extent to which they were uncomfortable having others in their group see their performance, and the differences between the two SCF conditions were also analyzed using an ANOVA.

Experimental Procedures

Random assignment. After participants were recruited, they were randomly assigned to one of the four groups. Randomization into groups was done using a random number generator with numbers between one and four.

Introductory session. The first meeting with potential participants was held to obtain informed consent, assess if they met the requirements, and train them on the task and alternative activities (i.e., computer games and how to access the Internet browser). The training script can be found in Appendix O.

Covariate session. Before the covariate session and for all subsequent sessions, participants met with the experimenter in either room 2510 or 2512 Wood Hall. Participants were all paid fixed pay, $6.00, and were instructed to "do their best" during this session. The script for the covariate session can be found in Appendix P.

Based on an analysis of data from Einarsson (2016) a minimum performance standard of 100 correctly completed records was set for the covariate session, and participants were eliminated from the study if they failed to meet that standard. The standard was approximately 2.5 standard deviations below the mean and the lowest score attained in Einarsson (2016), separated from the next four to five lowest scores by more than 30 records. Because the covariate session was supposed to be an estimate of "do your best" performance, it was considered necessary to remove participants from the study who did not follow the instructions. Nine participants were eliminated due to this standard, three from each of the goal setting groups, one from the SCF fixed pay group and two from the SCF incentive pay group. Of the participants who were eliminated, three were female and six were male.

Experimental sessions. Participants in the incentive conditions were trained and given a short quiz to check their understanding of incentive pay systems. Participants were required to score 100% on the quiz, but were able to take multiple versions of the quiz until they scored 100%. The script for the incentive pay system training can be found in Appendix Q. After participants had scored 100% on the quiz, the script for the experimental sessions was read. The scripts for the experimental sessions, presented earlier, can be found in Appendices I, K, L, and N. After the scripted instructions, participants were escorted to a workstation in room 2532, Wood Hall. The participants started the session once they were ready. The computerized work task program automatically stopped after 45 minutes. After the session, participants confirmed their next session.

Debriefing session. Participants were debriefed after completing their fourth, and final, session. During the debriefing session, participants were asked to complete the stress/satisfaction questionnaire relevant to their group (see Appendix H). Once participants had finished the questionnaire, the experimenter explained the purpose of the study. The experimenter told participants how they did in their last session, answered any questions they had, and paid them. Debriefing scripts can be found in Appendix R. Participants were given a receipt and paid in cash. The receipt can be found in Appendix S. Lastly, the experimenter thanked participants for their participation in the study.

RESULTS

Primary Analysis

Table 1 displays the means and standard deviations for correctly completed records for the four conditions during the covariate session and the experimental sessions. Table 2 displays the adjusted means for correctly completed records.

Table 1

Means and Standard Deviations for Correctly Completed Records

		Sessions			
		Covariate		Experimental	
Condition	*n*	Mean	*SD*	Mean	*SD*
Goal-Setting and Fixed Pay	20	205.50	58.05	255.33	66.00
Social Comparison Feedback and Fixed Pay	22	208.59	55.76	270.17	87.28
Goal-Setting and Incentive Pay	19	195.79	55.42	255.56	88.91
Social Comparison Feedback and Incentive Pay	20	223.15	56.83	287.98	79.72

Table 2

Adjusted Means for Correctly Completed Records

Condition	Fixed Pay	Incentive Pay	Overall
Goal-Setting	258.40	269.00	263.70
Social Comparison Feedback	270.00	286.80	278.40
Overall	264.21	277.89	

ANCOVA requires homogeneous regression slopes and an analysis of the regression slopes determined them to be homogeneous, $F(3, 80) = .40$, $p = .754$. Having met the requirements, a two-factor ANCOVA was conducted to analyze differences between the conditions on the primary dependent variable (average number of correctly completed records). Table 3 displays the source table for the two-factor ANCOVA. The adjusted means for the goal-

setting feedback and the social comparison feedback interventions (Factor A) were 263.70 and 278.40, respectively. The difference of 14.70 was not statistically significant ($F = 1.85$, $p = 0.178$). The adjusted means for the fixed pay and incentive pay interventions (Factor B) were 264.21 and 277.89, respectively. The difference of 13.68 was not statistically significant either ($F = 1.63$, $p = 0.205$). No significant interaction effect was detected ($F = 0.09$, $p = 0.771$).

Table 3

Source Table for Two-Factor Analysis of Covariance

Source	*df*	*SS*	*MS*	*F*	*p*
Covariate	1	277001	277001	119.70	0.000
Type of Feedback (A)	1	4284	4284	1.85	0.178
Type of Pay (B)	1	3779	3779	1.63	0.205
A x B	1	198	198	0.09	0.771
Error	76	175878	2314		
Total	80	482113			

Revised Primary Analysis

A visual inspection of the data for performers who were not positively affected by the incentives led to the detection of a potential sequence effect. During the covariate session, participants were instructed to "do their best" and paid $6.00. During the experimental sessions, participants in the incentive conditions were paid two cents per correct record. In the incentive conditions, participants who correctly completed the average number of records, as determined from a previous study (Einarsson, 2016), would have earned about $6.00. Thus, the low performers in the current study earned less money during the first experimental session than during the covariate session. Inspection of the data revealed that if participants earned less than $4.00 in the first experimental session they were unlikely to improve their performance in the subsequent sessions. These unintended consequences of the experimental arrangements did not seem to apply to average and high performers. Because of this, the data for all participants (in all

four conditions) who correctly completed fewer than 199 records in the first experimental session were removed from the dataset. This resulted in the removal of data for seventeen participants, three to five in each condition. Of those, thirteen were female and four were male. Table 4 shows the revised number of participants, means, and standard deviations for correctly completed records for each condition and Table 5 shows the revised adjusted means.

Table 4

Means and Standard Deviations for Correctly Completed Records Excluding Low Performers

		Sessions			
		Covariate		Experimental	
Condition	*n*	Mean	*SD*	Mean	*SD*
Goal-Setting and Fixed Pay	17	218.88	51.38	268.67	59.42
Social Comparison Feedback and Fixed Pay	17	226.35	48.51	304.18	65.99
Goal-Setting and Incentive Pay	14	216.71	45.75	294.67	63.44
Social Comparison Feedback and Incentive Pay	16	234.56	57.60	324.02	69.41

Table 5

Adjusted Means for Correctly Completed Records Excluding Low Performers

Condition	Fixed Pay	Incentive Pay	Overall
Goal-Setting	273.28	301.20	287.23
Social Comparison Feedback	302.41	315.20	308.82
Overall	287.84	308.21	

An analysis of the regression slopes determined them to be homogeneous, $F(3, 63) = .46$, $p = .710$. As before, a two-factor ANCOVA was conducted to analyze differences between the conditions on the primary dependent variable. Table 6 displays the source table for the two-factor ANCOVA excluding low performers. The adjusted means for the goal-setting feedback and the social comparison feedback interventions (Factor A) were 287.23 and 308.82, respectively. The difference was 21.59, which is considerably larger than the difference between the adjusted means (14.70) when low performers were included in the analysis. Unlike the

previous analysis, the difference between these adjusted means was statistically significant (F = 4.55, p = 0.037). These results confirm that participants in the social comparison feedback conditions performed higher than those in the goal-setting conditions. The adjusted means for the fixed pay and incentive pay interventions (Factor B) were 287.84 and 308.21, respectively. The difference was 20.37, which again is considerably larger than the difference (13.28) in the original analysis that included low performers. The difference between these means was also statistically significant (F = 4.11, p = 0.047). These results confirm that participants in the incentive pay conditions performed higher than those in the fixed pay conditions. No significant interaction effect was detected (F = 0.56, p = 0.457).

Table 6

Source Table for Two-Factor Analysis of Covariance Excluding Low Performers

Source	*df*	*SS*	*MS*	*F*	*p*
Covariate	1	115214	115214	71.88	0.000
Type of Feedback (A)	1	7295	7295	4.55	0.037
Type of Pay (B)	1	6587	6587	4.11	0.047
A x B	1	900	900	0.56	0.457
Error	59	94563	1603		
Total	63	236067			

Due to the significant findings from the revised primary analysis, all of the following results and analyses will be based on data excluding low performers. However, analyses based on all of the participants can be found in Appendix T.

Secondary Analysis

Table 7 displays the means and standard deviations for the secondary dependent variables, the three factors that could have affected the primary dependent variable (correctly completed records).

The relationships between the primary dependent variable and the secondary dependent variables were calculated using Pearson product moment correlations and the results are shown in Table 8. There were two significant correlations. There was a close to perfect positive correlation between correctly completed medical records and rate, and a moderate positive correlation between correctly completed medical records and time on task. Other correlations were not significant.

Table 7

Means and Standard Deviations for Accuracy, Rate, and Time on Task

		Accuracy		Rate		Time on Task	
Condition	*n*	Mean	*SD*	Mean	*SD*	Mean	*SD*
Goal-Setting and Fixed Pay	17	97.40%	2.66%	6.35	1.20	42.75	4.05
Social Comparison Feedback and Fixed Pay	17	95.97%	7.36%	6.90	1.22	43.05	4.38
Goal-Setting and Incentive Pay	14	97.36%	2.48%	6.95	1.40	42.33	3.25
Social Comparison Feedback and Incentive Pay	16	97.06%	2.54%	7.35	1.47	43.81	2.07

Table 8

Correlations Between the Primary and Secondary Dependent Variables

	Time on Task	Rate	Accuracy
Correctly Completed Medical Records	.48*	.94*	.14
Time on Task		.18	-.06
Rate			.28

*$p < 0.001$

Questionnaire Analysis

Excluding the low performers, 64 participants answered the post-study questionnaire. All questions used a Likert scale, where 1 = strongly disagree and 5 = strongly agree. Participants in

all conditions answered four questions related to stress, motivation, and satisfaction. Table 9 shows the means and standard deviations for each of the four questions. Tables 10, 11, 12, and 13 display information from the subsequent ANOVAs that were conducted to determine whether differences existed between the groups means. No significant difference was detected between the conditions for any of the four questions.

Table 9

Means and Standard Deviations for Stress, Motivation, and Satisfaction Questions

		"I was stressed or anxious when performing the task"		"I did my best every session"		"I tried to improve my performance from session to session"		"I was satisfied with the pay system"	
Condition	*n*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
Goal-Setting and Fixed Pay	17	1.82	1.24	4.18	.64	4.41	.71	4.88	.33
Social Comparison Feedback and Fixed Pay	17	1.82	.81	4.00	1.12	4.65	.60	4.76	.44
Goal-Setting and Incentive Pay	14	1.93	1.00	3.93	.73	4.71	.61	4.64	.63
Social Comparison Feedback and Incentive Pay	16	1.75	.86	4.38	.50	4.75	.45	4.50	.89
Overall	64	1.83	.97	4.13	.79	4.63	.60	4.70	.61

An extra question was included on the questionnaire for the SCF conditions to measure whether participants were uncomfortable having other people see their performance. As before, this question used a Likert scale, where 1 = strongly disagree and 5 = strongly agree. In the fixed

pay condition, the mean rating for the question "I was uncomfortable having other people in my group see my performance" was 1.65 (*SD* = 1.17). The mean rating for the incentive condition was 1.6 (*SD* = 1.12). The mean ratings suggest that participants were not uncomfortable with other people being able to see how well they were performing. Table 14 displays the information from ANOVA that was conducted to see if there was a difference between the two conditions. No significant difference was detected.

Table 10

ANOVA Source Table for "I was Stressed or Anxious When Performing the Task"

Source	*df*	SS	MS	*F*	*p*
Treatment	3	.24	.08	.08	.970
Error	60	58.87	.98		
Total	63	59.11			

Table 11

ANOVA Source Table for "I Did My Best Every Session"

Source	*df*	SS	MS	*F*	*p*
Treatment	3	1.85	.62	1.00	.401
Error	60	37.15	.62		
Total	63	39.00			

Table 12

ANOVA Source Table for "I Tried to Improve My Performance from Session to Session"

Source	*df*	SS	MS	*F*	*p*
Treatment	3	1.14	.38	1.05	.379
Error	60	21.86	.36		
Total	63	23.00			

Table 13

ANOVA Source Table for "I was Satisfied with the Pay System"

Source	*df*	SS	MS	*F*	*p*
Treatment	3	1.32	.44	1.20	.318
Error	60	22.04	.37		
Total	63	23.36			

Table 14

ANOVA Source Table for "I was Uncomfortable Having Other People in My Group See My Performance"

Source	*df*	SS	MS	*F*	*p*
Treatment	1	.02	.02	.01	.909
Error	30	39.48	1.32		
Total	31	39.50			

Goal Analysis

The differences in goal achievement between the conditions were explored. In the goal-setting conditions, the five goals were set so that approximately 90% (Goal 1), 75% (Goal 2), 50% (Goal 3), 25% (Goal 4), and 10% (Goal 5) of the participants were expected to achieve them, based on data from Einarsson (2016). In the SCF conditions, the performances of the five comparison participants that were displayed on the graph corresponded to the five goals. Goal achievement was defined as meeting the goal at least once during the three experimental sessions. Table 15 displays the percentage of participants, excluding low performers, in each condition who achieved each goal-level. Comparing the SCF condition to its goal-setting counterpart under the same payment condition, SCF resulted in higher percentages of goal attainment for every goal.

Table 16 shows the percentage of all participants (i.e., including the low performers) that achieved each of the five goals. While the percentage of participants that met each goal varied considerably across conditions, overall, each goal was achieved by the same percentage of participants as predicted, within a margin of error of five percent. Because the goals were based on data from Einarsson (2016) which included low performers, the percentages in Table 16 indicate that the goals were set at the appropriate levels, accurately capturing the range and level of participant performance in this study.

Table 15

Goal Achievement by Condition

Condition	*n*	Goal #1	Goal #2	Goal #3	Goal #4	Goal #5
Goal-Setting and Fixed Pay	17	100%	70.59%	35.29%	23.53%	5.88%
Social Comparison Feedback and Fixed Pay	17	100%	94.12%	64.71%	41.71%	11.76%
Goal-Setting and Incentive Pay	14	100%	92.86%	64.29%	14.29%	14.29%
Social Comparison Feedback and Incentive Pay	16	100%	93.75%	81.25%	43.75%	18.75%
Overall	64	100%	87.50%	60.94%	32.81%	12.50%

Table 16

Goal Achievement by Condition – All Participants

Condition	*n*	Goal #1	Goal #2	Goal #3	Goal #4	Goal #5
Goal-Setting and Fixed Pay	20	95.00%	60.00%	30.00%	25.00%	5.00%
Social Comparison Feedback and Fixed Pay	22	81.81%	72.73%	50.00%	31.82%	9.09%
Goal-Setting and Incentive Pay	19	78.95%	68.42%	47.37%	10.53%	10.53%
Social Comparison Feedback and Incentive Pay	20	95.00%	80.00%	70.00%	40.00%	15.00%
Overall	81	87.65%	70.37%	49.38%	27.16%	9.88%

DISCUSSION

Primary and Revised Primary Analyses

The main purpose of this study was to compare the effects of graphic SCF and tiered goals when individuals received fixed pay and incentive pay. The initial ANCOVA did not reveal any significant differences between the conditions for the primary dependent variable, the average number of correctly completed records. However, the primary analysis may not accurately reflect the true population differences. As mentioned in the **Results**, a visual inspection of the data revealed that low performers in the incentive conditions, unlike their higher-performing counterparts, did not improve their performance across sessions. This unusual pattern of performance probably resulted from the change in pay they received in the covariate session and the experimental sessions. In the covariate session, they received a fixed payment of $6.00; in the experimental sessions, they received 2 cents per correctly completed record. Because of their low performance, they earned considerably less in the experimental sessions than in the covariate session. Their low levels of responding during the experimental sessions, thus, appear to have been an unintended consequence of the experimental arrangements in this study.

The revised ANCOVA analysis, which excluded low performers in all four groups, showed that participants performed better (a) when they received incentive pay than when they received fixed pay, and (b) when they received graphic SCF than when they received graphic feedback based on tiered goals.

The results of this analysis are primarily important to the feedback literature because they demonstrate that feedback about the performance of others, also known as public normative feedback (Camden et al., 2011), can produce significantly higher levels of performance than feedback based on tiered goals when individuals receive either hourly pay or incentive pay. However, it should be noted that the performance differences between the SCF participants and the goal-setting participants, while statistically significant, were not substantial from a practical point of view. The SCF participants performed only about 7.5% better than the goal-setting participants, which converts to an effect size of .37—a small effect size.

Both SCF and goal-setting feedback established individualized, ability-based sub-goals for each performer in the study. That is, in terms of the content of the graphs, the graphic feedback looked similar in the two conditions. However, the results indicate that the behavioral mechanisms were different and that the normative component enhanced performance. Specifically, the stimuli "Sydney", "Li Ann", "DeAndre", "Alexis", and "Trevor" produced higher levels of performance than the stimuli "Goal 1", "Goal 2", "Goal 3", "Goal 4", and "Goal 5".

The design of the study does not permit answers to the question of why participants, on average, responded differently to SCF than goal-setting. It may be that people responded differently to "Sydney" than to "Goal 1" because of an extensive history of exposure to positive and negative consequences related to peer comparison. As mentioned in the **Introduction**, most people have a long history in which performing well in groups is reinforced and performing poorly in groups is punished. Another reason why people may have responded differently to the names is that the performance levels of others might be perceived as more attainable than

performance levels labeled as goals. In the past, for example, behaviors may have been reinforced when individuals modeled the behaviors of better-performing peers and matched their performance levels. These modeling behaviors may have generalized to the graphic SCF, possibly by rule-control. That is, the SCF may have evoked a rule similar to "If they can do it, I can do it". In contrast, labeling performance levels as "goals" may exert slightly less control because of past experiences in which individuals were assigned goals by others but they could not reach them.

The results of the revised analysis are in line with previous results from VanStelle (2012) and Einarsson (2016), and provide further evidence of the effectiveness of graphic SCF. As discussed in the **Introduction**, VanStelle compared the effects of graphic displays of (a) individual performance, (b) individual performance and average group performance, and (c) individual performance and the individual performance of each group member (referred to as SCF in the current study) when individuals were paid hourly. Performers who received SCF performed significantly better than those who received individual and group average feedback, who, in turn performed significantly better than those who received only individual feedback. SCF participants performed about 18% better than individual feedback participants.

Einarsson (2016), who compared graphic individual feedback with graphic SCF when individuals were paid incentives, also found that those who received SCF performed significantly better than those who received individual feedback. In that study, SCF participants performed about 7% better than individual feedback participants. The smaller difference is probably due to the fact that the incentives themselves increased performance and thus attenuated the effects of the two types of feedback. Regardless, the difference between the two groups was statistically significant.

As mentioned earlier in this section, in the current study, the graphic SCF participants performed significantly better than the goal-setting participants, with a performance difference of 7.5%. Thus, in all three studies (Einarsson, 2016; VanStelle, 2012), graphic SCF resulted in higher levels of performance than the alternatives that were examined, regardless of whether participants received hourly pay or incentive pay. Further, although an across-study comparison is problematic due to the exclusion of the low performers in the current study, when participants were paid incentives, those who received SCF outperformed those who received individual feedback (Einarsson, 2016) and those who received goal-setting feedback (the current study) by relatively similar percentages, 7% and 5%, respectively.

As noted above, a comparison of the results of VanStelle (2012) and Einarsson (2016) suggest that incentives mitigated the performance difference between the SCF participants and the individual feedback participants. The results of the current study support that analysis because incentives had a similar mitigating effect. When participants received hourly pay, SCF participants performed about 11% better than goal-setting feedback participants; when participants received incentives, SCF participants performed only about 5% better.

The significant results of the revised analysis differ from the results in Sundberg (2015). Similar to the current study, Sundberg gave participants five tiered performance goals and provided them with graphic feedback. In one condition participants received fixed pay and in another condition participants received base pay plus piece rate pay. Although the adjusted mean performance of the incented participants was higher than the adjusted mean performance of the fixed pay participants, the difference was not statistically significant. In the current study, in contrast, the adjusted mean difference between participants who received fixed pay and incentive pay was statistically significant. And, although there was not a significant interaction effect in

the current study, it is worth noting in this context that the adjusted mean performance of the incented participants who received goal-setting feedback was about 10% higher than the adjusted mean performance for the fixed pay participants who received goal-setting feedback. In Sundberg, the percentage difference between the adjusted mean performances of the piece-rate pay participants and fixed pay participants was similar—piece rate participants performed about 13% better than the fixed pay participants. Thus, the results of the tiered goal-setting conditions in the current study are in line with both the direction and size of the difference in similar conditions in Sundberg.

Secondary Analyses

There were two significant correlations between the primary dependent variable and the secondary dependent variables. The first significant correlation was between rate and correctly completed records, which had an almost perfect positive correlation. The second significant relationship was between time on task and correctly completed records, which had a moderate positive correlation. The results are similar to other studies using the same task (Sundberg, 2015; VanStelle, 2012). Interestingly, the average and high performers in this study spent almost the entire 45-minute session on task. For the four conditions, the lowest time on task mean was 42.33 minutes and the highest was 43.81 minutes. The time on task numbers are especially notable with regards to the two fixed pay conditions in the study.

Questionnaire Analysis

According to the questionnaire responses, participants were not stressed or anxious performing the task (1.83/5.00), were generally doing their best every session (4.14/5.00), were trying to improve their performance every session (4.63/5.00), and were satisfied with the payment system (4.70/5.00). The data in the study corroborate the questionnaire data because

participants, in all four conditions, improved their performance, on average, from session to session with one exception: The fixed pay SCF participants performed approximately the same in sessions 2 and 3.

Participants in the SCF conditions seemed comfortable with their performance being shown to other participants. The mean score for participants in the fixed pay SCF condition was 1.65/5.00 and the mean score for participants in the incentive pay SCF condition was 1.60/5.00. The scores from both conditions in this study are consistent with those from VanStelle (2012) and Einarsson (2016). However, it remains to be seen if the results generalize to actual work settings. The results from this question on the questionnaire may not be applicable to real life settings because participants did not know each other, did not interact with each other, and did not receive any critique for low performances—all of which could be significant factors in making SCF more aversive (Einarsson, 2016). In order to determine the aversiveness of SCF in actual work settings, further research is required.

Goal Analysis

The goal analysis based on average and high performers revealed some interesting differences between the groups. First, the goal-setting with fixed pay condition generally had the lowest percentages of goal attainment. For example, in the other three conditions over 92% of participants met the second goal; however only 70.59% of participants in the goal-setting with fixed pay condition met it. Second, the SCF with fixed pay condition had similar or higher percentages of goal attainment than the goal-setting with incentive condition. This is highlighted for the fourth goal: 41.76% of the participants in the SCF with fixed pay condition attained the goal but only 14.29% of the participants in the goal-setting with incentive condition attained it.

Strengths

This study was the first study to directly compare, and do a component analysis of, normative feedback and goal setting, research suggested by Einarsson (2016) and Johnson (2013). As a laboratory study, it was possible to isolate the effects of the graphic SCF and graphic goal-setting feedback on performance from other types of feedback. As demonstrated by Johnson (2013), evaluative responses about performance by the researcher can significantly impact performance and researchers in this study were trained to avoid giving any type of evaluative feedback on performance when handing graphs to participants.

Another strength of this study was that the graphic SCF only contained information about five other performers. Participants in the SCF condition in VanStelle (2012) complained about "general confusion" due to having so many performances portrayed in the graphic feedback. The SCF condition in VanStelle had about 16-19 participants. Einarsson (2016) had 27 participants in the SCF condition, although that study took steps to make the performance of the receiver of the graph easily identifiable. This study, by having only five performances to compare to in the SCF condition, eliminated any notion of clutter on the graph being given to participants and demonstrated that graphic SCF can have a significant effect with as few as five other performers.

Limitations

A major limitation of this study concerns the way participants were paid in the covariate session and experimental sessions. Low performers in the incentive conditions earned considerably less money in the experimental sessions than they did during the covariate session when they were paid $6.00 regardless of how well they performed. A visual inspection of the data indicated that the performance of these participants during the experimental sessions was reduced by this decrease in pay. This reduction seems to have been why the mean differences

between the major dependent variable were not statistically significant for either of the independent variables, the pay system or type of feedback. It was only after excluding low performers from all conditions in the revised analysis, that significant differences were found between both factors in the study. This suggests that the results of the study may only generalize to average and high performers. A replication of this study that avoids the sequence effects detected in this study is required in order to further analyze the effects of the independent variables examined in this study.

Although the laboratory setting made it possible to isolate the effects of the independent variables on performance, it was also responsible for isolating participants from various social consequences that people experience when working with other people in actual workplaces, many of which could make SCF more aversive. This is a limitation with regards to the generalization of the effectiveness of SCF and how aversive it is. Lastly, the performance of the undergraduate participants in the study may not have been fully under the control of the independent variables used in this study. Rather, some participants may have been mainly motivated to participate in the study because of the extra course credit they received. If that was the case, it could help explain the small difference that was found between the fixed and incentive pay conditions in the study.

Future Research

As previously noted, the revised primary analysis excluded low performers and it was only at that point that the differences between both factors in the current study were significantly different. Future research should replicate this study in a way that avoids the carry-over effects of the covariate session to the experimental sessions. It is important to determine whether the

results of such a study would be consistent with the results of the revised analysis in the current study.

Future research should implement SCF in actual work settings while specifically collecting information about how staff react to its use and whether social interactions among staff change. It would be of great value to be able to compare the results of the three laboratory studies, VanStelle (2012), Einarsson (2016), and the current study, to the results of an applied field study that implemented this type of SCF and compared it to other types of feedback.

Finally, future studies should further examine the utility of tiered goals and, specifically, whether tiered goals can be made more effective with different instructions and evaluative feedback. In this study, the only information that participants received related to the goals was "Notice that there are five performance goals listed for you on the graph". An anecdotal observation from the study was that some participants would seek out clarification or ask repeatedly if they were supposed to achieve these goals after hearing the performance goals instructions. This suggests that if the instructions had been different and asked participants to attain the highest goal possible, that such instructions along with evaluative feedback after each session might have evoked a new rule making goal achievement function as a reinforcer, or a stronger reinforcer than it was. It would be interesting to see an evaluation of the effects of clear directions and evaluative feedback about reaching higher and higher goals to the participants and if such directions and evaluative feedback would have a larger impact with tiered goals compared to SCF.

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Appendix A

HSIRB Approval Letter

WESTERN MICHIGAN UNIVERSITY

Human Subjects Institutional Review Board

Date: January 18, 2017

To: Alyce Dickinson, Principal Investigator
Yngvi Einarsson, Student Investigator for dissertation

From: Amy Naugle, Ph.D., Chair Amy Naugle

Re: HSIRB Project Number 17-01-18

This letter will serve as confirmation that your research project titled "Social Comparison Feedback and Goal-Setting under Fixed Pay and Incentive Pay" has been **approved** under the **expedited** category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note: This research may **only** be conducted exactly in the form it was approved. You must seek specific board approval for any changes in this project (e.g., ***you must request a post approval change to enroll subjects beyond the number stated in your application under "Number of subjects you want to complete the study***)." Failure to obtain approval for changes will result in a protocol deviation. In addition, if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

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

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

Approval Termination: **January 17, 2018**

1903 W. Michigan Ave., Kalamazoo, MI 49008-5456
PHONE: (269) 387-8293 FAX: (269) 387-8276
CAMPUS SITE: 251 W. Walwood Hall

Appendix B

Informed Consent Form: Goal-setting Conditions

Western Michigan University
Department of Psychology

Principal Investigator: Alyce M. Dickinson, Ph.D.
Student Investigator: Yngvi F. Einarsson, M.A.
Title of Study: Performance on a Medical Transcription Data Entry Task When Participants Receive Performance Feedback

You have been asked to participate in a research project titled "Performance on a Medical Transcription Data Entry Task When Participants Receive Performance Feedback." This project will serve as Yngvi Einarsson's dissertation project under the supervision of Alyce Dickinson, Ph.D. This informed consent document will explain the purpose of this research project and will cover information related to the project, including expected time commitments, research procedures to be used in the study, and any risks or benefits associated with participating in this research project.

What are we trying to find out in this study?
The purpose of this study is to examine productivity levels on a medical data entry task across time when performers are given performance feedback.

Who can participate in this study?
Three inclusionary criteria will be used. First, you must not have participated in performance management research projects using the medical data entry task. Second, you will be excluded if you currently have or have had a data processing job. Lastly, you must be available for four 45-minute sessions during the Spring 2017 semester.

Where will the study take place?
The study will be conducted in room 2532, Wood Hall.

What is the time commitment for participating in this study?
You must be available for four 45-minute sessions in Spring 2017 semester for a total time commitment of approximately 3-4 hours.

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 transcription data entry task, a task designed to simulate the job of a medical data entry clerk. The computer program will provide you with data corresponding to patients. You will first type the patient's ID number into a box labeled "PATIENT ID," and then, based on the information provided by the program, indicate whether the medical data for that patient is inside or outside the normal range by clicking on the appropriate button. After you click the "Submit" button, information about another patient will be presented. Also, after your last session, you will be asked to answer questions about your experience during the study. Lastly, you will be asked not to talk to anyone about the features of this study.

What information is being measured during this study?
The computer will automatically take measures of your performance on the medical transcription

data entry task. Also, at the end of the study you will be asked to indicate your satisfaction with the procedures and how much stress you felt performing the task.

What are the risks of participating in this study and how will these risks be minimized?
The nature of this computer-based task is one that requires little physical effort, and should not expose you to risks greater than those you experience in your everyday activities. During sessions you may become tired or experience minor physical discomfort or stress. To minimize these risks, you may take breaks whenever you like. During these breaks you may play one of several computer games on the workstation computer, browse the Internet, play with your smartphone or just relax.

What are the benefits of participating in this study?
Data from your participation may benefit the general scientific community by providing information on performance feedback and productivity. You may also learn about research through participation in this study. This study will add to our understanding of how working conditions affect performance, satisfaction, and stress. The findings from analogue studies such as this can be applied in workplace settings.

Are there any costs associated with participating in this study?
Besides the time commitment of approximately 3-4 total hours, there are no costs associated with participating in this study.

Is there any compensation for participating in this study?
For each of the four experimental sessions, you will be compensated. You will receive about $6.00 for each 45-minute session. The amount earned may be dependent on your performance. You will be paid in cash during the debriefing session, after your last experimental session. If you decide to withdraw from this study, you will be paid for your performance up until the point of withdrawal.

Who will have access to the information collected during the 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 code number so that your individual progress can be tracked while your identity is held strictly confidential. When the data from the study are presented or published, your data will be combined with the data from others, and only group data will be presented. You will not be identified.

What if you want to stop participating in this study?
You can choose to stop participating in this 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 should have any questions before or during the study, you can contact the primary investigator, Dr. Alyce Dickinson at (269) 387-4473, or the student investigator at (269) 779-4297. 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 throughout the course of this study.

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

Your signature below indicates that you read the above information and agree to participate in the study.

_____
Please Print Your Name

_____ _____
Participant Signature Date

Please keep the attached copy of this form for your records.

Appendix C

Informed Consent Form: Social Comparison Feedback Conditions

Western Michigan University
Department of Psychology

Principal Investigator: Alyce M. Dickinson, Ph.D.
Student Investigator: Yngvi F. Einarsson, M.A.
Title of Study: Performance on a Medical Transcription Data Entry Task When Participants Receive Performance Feedback

You have been asked to participate in a research project titled "Performance on a Medical Transcription Data Entry Task When Participants Receive Performance Feedback." This project will serve as Yngvi Einarsson's dissertation project under the supervision of Alyce Dickinson, Ph.D. This informed consent document will explain the purpose of this research project and will cover information related to the project, including expected time commitments, research procedures to be used in the study, and any risks or benefits associated with participating in this research project.

What are we trying to find out in this study?
The purpose of this study is to examine productivity levels on a medical data entry task across time when performers are given performance feedback.

Who can participate in this study?
Three inclusionary criteria will be used. First, you must not have participated in performance management research projects using the medical data entry task. Second, you will be excluded if you currently have or have had a data processing job. Lastly, you must be available for four 45-minute sessions during the Spring 2017 semester.

Where will the study take place?
The study will be conducted in room 2532, Wood Hall.

What is the time commitment for participating in this study?
You must be available for four 45-minute sessions in Spring 2017 semester for a total time commitment of approximately 3-4 hours.

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 transcription data entry task, a task designed to simulate the job of a medical data entry clerk. The computer program will provide you with data corresponding to patients. You will first type the patient's ID number into a box labeled "PATIENT ID," and then, based on the information provided by the program, indicate whether the medical data for that patient is inside or outside the normal range by clicking on the appropriate button. After you click the "Submit" button, information about another patient will be presented. Also, after your last session, you will be asked to answer questions about your experience during the study. Lastly, you will be asked not to talk to anyone about the features of this study.

What information is being measured during this study?
The computer will automatically take measures of your performance on the medical transcription

data entry task. Also, at the end of the study you will be asked to indicate your satisfaction with the procedures and how much stress you felt performing the task.

What are the risks of participating in this study and how will these risks be minimized?
The nature of this computer-based task is one that requires little physical effort, and should not expose you to risks greater than those you experience in your everyday activities. During sessions you may become tired or experience minor physical discomfort or stress. To minimize these risks, you may take breaks whenever you like. During these breaks you may play one of several computer games on the workstation computer, browse the Internet, play with your smartphone or just relax.

Additionally, your identity will be revealed to other participants. You will be assigned to a work group, and your name will be displayed on feedback graphs for your group along with the names of all other group members. This means that group members will be able to compare their performance with the performance of others.

What are the benefits of participating in this study?
Data from your participation may benefit the general scientific community by providing information on performance feedback and productivity. You may also learn about research through participation in this study. This study will add to our understanding of how working conditions affect performance, satisfaction, and stress. The findings from analogue studies such as this can be applied in workplace settings.

Are there any costs associated with participating in this study?
Besides the time commitment of approximately 3-4 total hours, there are no costs associated with participating in this study.

Is there any compensation for participating in this study?
For each of the four experimental sessions, you will be compensated. You will receive about $6.00 for each 45-minute session. The amount earned may be dependent on your performance. You will be paid in cash during the debriefing session, after your last experimental session. If you decide to withdraw from this study, you will be paid for your performance up until the point of withdrawal.

Who will have access to the information collected during the 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 code number so that your individual progress can be tracked while your identity is held strictly confidential. When the data from the study are presented or published, your data will be combined with the data from others, and only group data will be presented. You will not be identified.

As described above, however, there is an exception to your confidentiality. Your first name and the number of medical records you correctly complete will be displayed on a feedback graph and shown to other members of your assigned group during the study (as described above in the **Risks** section).

What if you want to stop participating in this study?
You can choose to stop participating in this 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 should have any questions before or during the study, you can contact the primary investigator, Dr. Alyce Dickinson at (269) 387-4473, or the student investigator at (269) 779-4297. 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 throughout the course of this study.

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

Your signature below indicates that you read the above information and agree to participate in the study.

_____
Please Print Your Name

_____ _____
Participant Signature Date

Please keep the attached copy of this form for your records.

Appendix D

Participant Recruitment Script

Participant Recruitment Script

To be read aloud by the student investigator or research assistant at undergraduate classes:

"Hi, my name is X. I am visiting your class today to recruit participants for a study in Industrial/Organizational psychology. The study will be conducted in Wood Hall. The study is investigating performance on a data entry task when individuals are given performance feedback.

The task is meant to simulate the task of a medical data entry clerk. You will earn approximately $24 for completing four 45-minute sessions. You may also be able to earn extra credit in some of your classes, depending upon whether your instructor makes that available.

Anyone can be a participant, with the following exceptions: You must be available for four 45-minute session during the Spring 2017 semester. Additionally, you cannot have previously participated in other performance management studies using the same medical data entry task. Further, you can't have or have had a data processing job to be included in the study.

Your participation is completely voluntary and you may withdraw at any time. If you do withdraw, you will be paid the money you have earned up to that point. Your willingness to participate in the study or your withdrawal from the study will not affect your grade in any course and your identity will remain confidential.

If you are interested in learning more about the study, please list your contact information on the individual participant recruitment slips, which I will collect in a few minutes. You can also contact us at yngvi.f.einarsson@wmich.edu or (269) 779-4297 (will write these on the board). Please remember that you must be available for 4 sessions during the Spring 2017 semester. I will contact you within the day to talk more about your potential participation.

Thank you for your time."

Appendix E

Participant Recruitment Flyer

Research Participants Needed!!!

Are you interested in earning money and participating in research over the semester?

We're looking for individuals to participate in a study designed to examine productivity levels on a medical data entry task when performers are given performance feedback. Participants will earn approximately $24 for completing four 45-minute sessions.

To be eligible for participation in this study:

- You must be available for four 45-minute sessions (in Wood Hall) during the Spring 2017 semester.
- You cannot have previously participated in other performance management studies using the same medical data entry task here at Western Michigan University
- You must not have had or currently have a data processing job.

If you are interested in learning more about this study, please contact Yngvi Einarsson at Yngvi.f.Einarsson@wmich.edu or (269) 997-4297. Be sure to provide your name, e-mail address or telephone number, and the times you can be reached.

Please remember that you must be available for 4 sessions during the Spring 2017 semester.

All information is confidential!
For more information contact **Yngvi Einarsson**
E-mail: Yngvi.F.Einarsson@wmich.edu or Phone: (269) 779-4297
Thank you!

Yngvi Einarsson
Yngvi.f.einarsson@wmich.edu

Appendix F

Study Inclusion Questionnaire

Participant #_____

1. **Sex:** Male Female

2. **Age:** _____

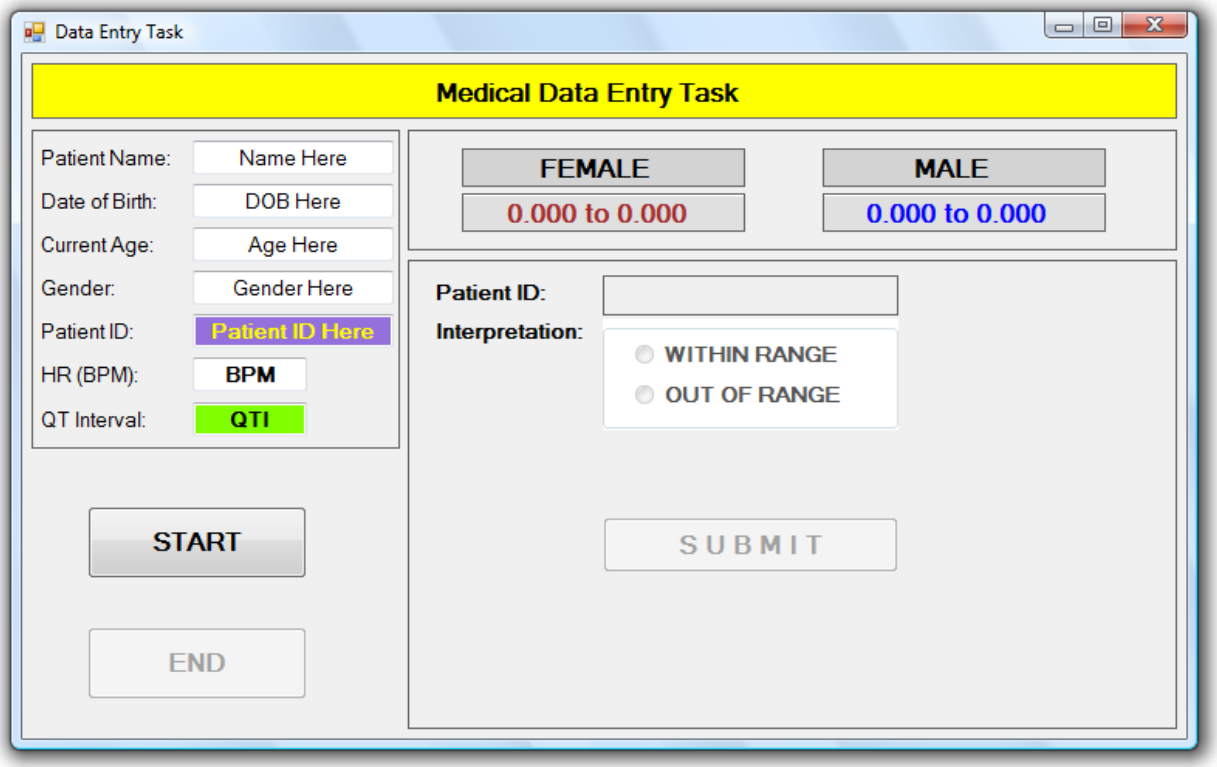
3. Are you receiving extra credit in one of your courses for participating in this study?
Yes: _____ No: _____

4. Have you ever participated in a study using a medical data entry task at Western Michigan University (a screenshot of the task is available if you are not sure) ?
Yes: _____ No: _____

5. Do you currently or have you held a position that involved data entry?
Yes: _____ No: _____

Appendix G

Screenshot of Experimental Task


Data Entry Task
Medical Data Entry Task
Patient Name:
Name Here
Date of Birth:
DOB Here
Current Age:
Age Here
Gender:
Gender Here
Patient ID:
Patient ID Here
HR (BPM):
BPM
QT Interval:
QTI
START
END
FEMALE
0.000 to 0.000
MALE
0.000 to 0.000
Patient ID:
Interpretation:
WITHIN RANGE
OUT OF RANGE
SUBMIT

Appendix H

Participant Questionnaires

Exit Survey

We would like to begin by thanking you for your participation in this study. Please answer the following questions about your experience.

1. I was stressed or anxious when performing the task

Strongly Disagree 1----------2----------3----------4----------5 Strongly Agree

Using the evaluation scale, please circle the number which reflects your opinion.

2. I did my best every session

Strongly Disagree 1----------2----------3----------4----------5 Strongly Agree

Using the evaluation scale, please circle the number which reflects your opinion.

3. I tried to improve my performance from session to session

Strongly Disagree 1----------2----------3----------4----------5 Strongly Agree

Using the evaluation scale, please circle the number which reflects your opinion.

4. I was satisfied with the pay system

Strongly Disagree 1----------2----------3----------4----------5 Strongly Agree

Using the evaluation scale, please circle the number which reflects your opinion.

Exit Survey

We would like to begin by thanking you for your participation in this study. Please answer the following questions about your experience.

1. I was stressed or anxious when performing the task

Strongly Disagree 1----------2----------3----------4----------5 Strongly Agree

Using the evaluation scale, please circle the number which reflects your opinion.

2. I did my best every session

Strongly Disagree 1----------2----------3----------4----------5 Strongly Agree

Using the evaluation scale, please circle the number which reflects your opinion.

3. I tried to improve my performance from session to session

Strongly Disagree 1----------2----------3----------4----------5 Strongly Agree

Using the evaluation scale, please circle the number which reflects your opinion.

4. I was satisfied with the pay system

Strongly Disagree 1----------2----------3----------4----------5 Strongly Agree

Using the evaluation scale, please circle the number which reflects your opinion.

5. I was uncomfortable having other people in my group see my performance

Strongly Disagree 1----------2----------3----------4----------5 Strongly Agree

Using the evaluation scale, please circle the number which reflects your opinion.

Appendix I

Instructional Script: Goal-setting with Fixed Pay

Beginning of Session Instructions:

**Before the participant arrives, the research assistant will take out the graph of previous performance for the participant. When the participant arrives in either 2510 or 2512 Wood Hall, the research assistant will greet the participant and close the door (to ensure privacy).

**The research assistant will then read aloud:

"Remember that before you go to the experimental room, make sure that any devices you do bring with you to the experimental room are completely silent in order not to disturb other participants in the study."

"You will be working on the medical transcription task again today. I want to remind you that you will be paid $6.00 for this session and paid at the end of the study. If you feel tired and need a break, you may take a break and will not be penalized for taking the break. You can relax, play any of the available computer games, browse the Internet or use your smartphone as long as you are not interrupting or disturbing other participants."

"Here is a graph of your performance for each session so far. This graph will get updated with your information after every session that you complete. Your data path is represented here (**RA should point to the participant's data). *Notice that there are five performance goals listed for you on the graph.*
Also, at the bottom of the graph the number of medical records you correctly completed and the amount you earned in the last session is listed."

**The research assistant will give the participant a moment to look at the graph, and will then answer any questions the participant may have about it.

**The research assistant will read aloud:

Please work at your own pace for the next 45 minutes. It is also important that you stay at your workstation and do not talk to any of the other people present in the lab room. If you have any questions, I will be on the other side of the room. You can stand up and let me know when your session is over."

**The research assistant will take the participant to his or her workstation in the laboratory room (2532 Wood Hall) and prompt him or her to begin their work session.

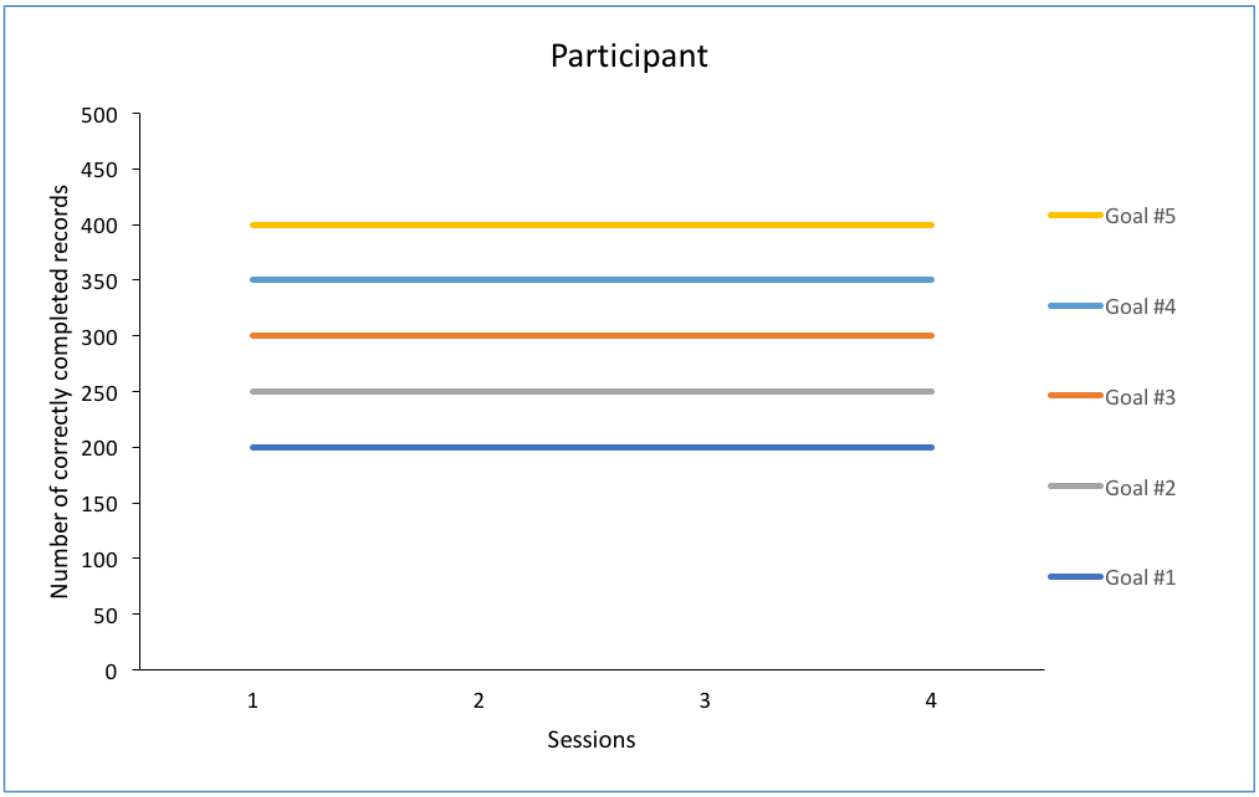
**The research assistant observes the participant start their session.

End of Session:

**The research assistant waits until the participant's 45-minute session is over; the research assistant will then take the participant back to either 2510 or 2512 Wood Hall and remind the participant when his or her next session is.

Appendix J

Sample of Goal-setting Graph



Session #____

Correctly Completed Records _____

Amount Earned _____

Appendix K

Instructional Script: Goal-setting with Incentive Pay

Beginning of Session Instructions:

** When the participant arrives in either 2510 or 2512 Wood Hall, the research assistant will greet the participant and close the door (to ensure privacy).

**The research assistant will read aloud:

"Remember that before you go to the experimental room, make sure that any devices you do bring with you to the experimental room are completely silent in order not to disturb other participants in the study."

"You will be working on the medical transcription task again today. Your pay will be based on your performance and you will be paid 2 cents for every correct medical record in the session and paid at the end of the study. If you feel tired and need a break, you may take a break and will not be penalized for taking the break. You can relax, play any of the available computer games, browse the Internet or use your smartphone as long as you are not interrupting or disturbing other participants."

"Here is a graph of your performance for each session so far. This graph will get updated with your information after every session that you complete. Your data path is represented here (**RA should point to the participant's data). *Notice that there are five performance goals listed for you on the graph.*
Also, at the bottom of the graph the number of medical records you correctly completed and the amount you earned in the last session is listed."

**The research assistant will give the participant a moment to look at the graph, and will then answer any questions the participant may have about it.

Please work at your own pace for the next 45 minutes. It is also important that you stay at your workstation and do not talk to any of the other people present in the lab room. If you have any questions, I will be on the other side of the room. You can stand up and let me know when your session is over."

**The research assistant will take the participant to his or her workstation in the laboratory room (2532 Wood Hall) and prompt him or her to begin their work session.

**The research assistant observes the participant start their session.

End of Session:

**The research assistant waits until the participant's 45 minute session is over; the research assistant will then take the participant back to either 2510 or 2512 Wood Hall and remind the participant when his or her next session is.

Appendix L

Instructional Script: Social Comparison Feedback with Fixed Pay

Beginning of Session Instructions:

**Before the participant arrives, the research assistant will take out the graph of previous performance for the participant. When the participant arrives in either 2510 or 2512 Wood Hall, the research assistant will greet the participant and close the door (to ensure privacy).

**The research assistant will read aloud:

"Remember that before you go to the experimental room, make sure that any devices you do bring with you to the experimental room are completely silent in order not to disturb other participants in the study."

"You will be working on the medical transcription task again today. I want to remind you that you will be paid $6.00 for this session and paid at the end of the study. If you feel tired and need a break, you may take a break and will not be penalized for taking the break. You can relax, play any of the available computer games, browse the Internet or use your smartphone as long as you are not interrupting or disturbing other participants."

**The research assistant will read aloud:

"Here is a graph of your performance for each session so far. This graph will get updated with your information after every session that you complete. Your data path is represented here (**RA should point to the participant's data). *Notice that there are other lines of data represented on the graph, there are 5 other people in your group and the other data lines represent their performance. Also, at the bottom of the graph the number of medical records you correctly completed and the amount you earned in the last session is listed."*

**The research assistant will be permitted to answer any questions that the participant has about where they fall in the data and can confirm or deny any of the participant's assertions related to the graph (i.e., so I am much lower/higher than participant 2,3,4 right?)

**The research assistant will give the participant a moment to look at the graph, and will then answer any questions the participant may have about it.

**The research assistant will read aloud:

Please work at your own pace for the next 45 minutes. It is also important that you stay at your workstation and do not talk to any of the other people present in the lab room. If you have any questions, I will be on the other side of the room. You can stand up and let me know when your session is over."

**The research assistant will take the participant to his or her workstation in the laboratory room (2532 Wood Hall) and prompt him or her to begin their work session.

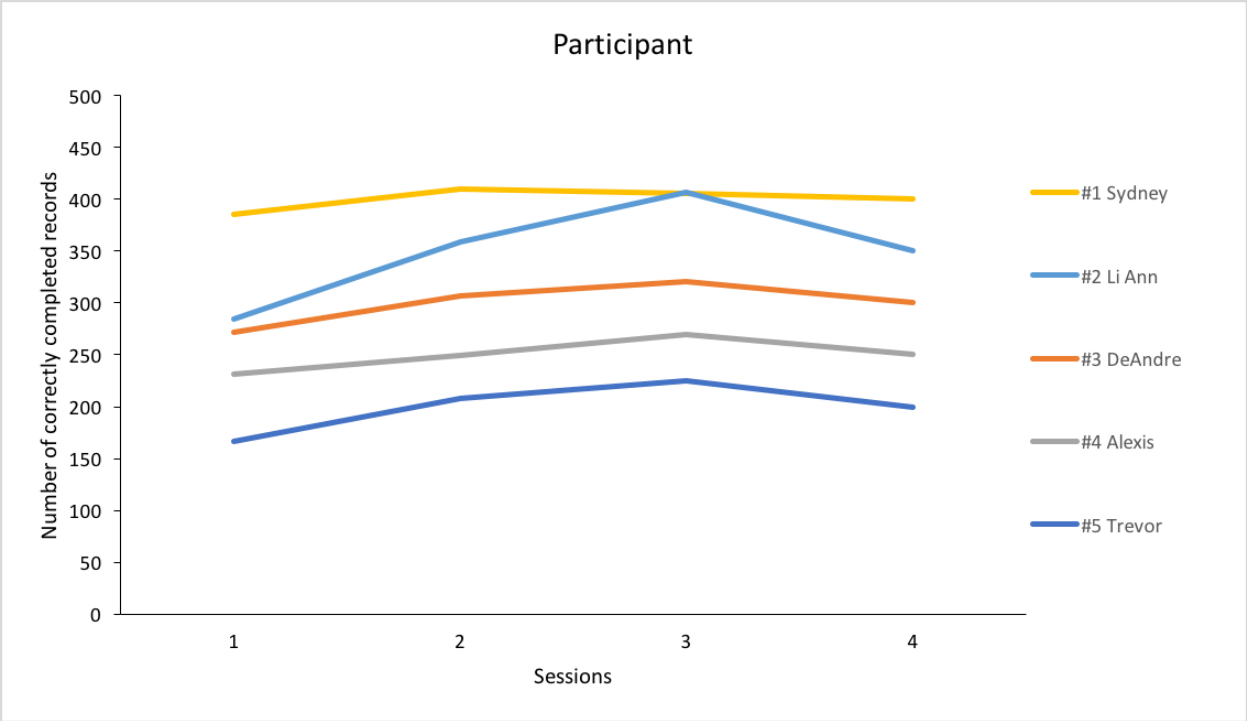
**The research assistant observes the participant start their session.

End of Session:

**The research assistant waits until the participant's 45-minute session is over; the research assistant will then take the participant back to either 2510 or 2512 Wood Hall and remind the participant when his or her next session is.

Appendix M

Sample of Social Comparison Feedback Graph



Session #____

Correctly Completed Records _____

Amount Earned _____

Appendix N

Instructional Script: Social Comparison Feedback with Incentive Pay

Beginning of Session Instructions:

**Before the participant arrives, the research assistant will take out the graph of previous performance for the participant. When the participant arrives in either 2510 or 2512 Wood Hall, the research assistant will greet the participant and close the door (to ensure privacy).

**The research assistant will read aloud:

"Remember that before you go to the experimental room, make sure that any devices you do bring with you to the experimental room are completely silent in order not to disturb other participants in the study."

"You will be working on the medical transcription task again today. Your pay will be based on your performance and you will be paid 2 cents for every correct medical record in the session and paid at the end of the study. If you feel tired and need a break, you may take a break and will not be penalized for taking the break. You can relax, play any of the available computer games, browse the Internet or use your smartphone as long as you are not interrupting or disturbing other participants."

**The research assistant will read aloud:

"Here is a graph of your performance for each session so far. This graph will get updated with your information after every session that you complete. Your data path is represented here (**RA should point to the participant's data). *Notice that there are other lines of data represented on the graph, there are 5 other people in your group and the other data lines represent their performance. Also, at the bottom of the graph the number of medical records you correctly completed and the amount you earned in the last session is listed."*

**The research assistant will be permitted to answer any questions that the participant has about where they fall in the data and can confirm or deny any of the participant's assertions related to the graph (i.e., so I am much lower/higher than participant 2,3,4 right?)

**The research assistant will give the participant a moment to look at the graph, and will then answer any questions the participant may have about it.

**The research assistant will read aloud:

Please work at your own pace for the next 45 minutes. It is also important that you stay at your workstation and do not talk to any of the other people present in the lab room. If you have any questions, I will be on the other side of the room. You can stand up and let me know when your session is over."

**The research assistant will take the participant to his or her workstation in the laboratory room (2532 Wood Hall) and prompt him or her to begin their work session.

**The research assistant observes the participant start their session.

End of Session:

**The research assistant waits until the participant's 45-minute session is over; the research assistant will then take the participant back to either 2510 or 2512 Wood Hall and remind the participant when his or her next session is.

Appendix O

Training Script

TRAINING SESSION (ALL GROUPS)

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

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

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

"Each computer has access to the Internet, as well as 6 computer games available for play at any time: Solitaire, Bejeweled, Mahjong, Text Twist, Jewel Quest, and Angry Birds. You are welcome to play these games, surf the Internet, play with your smart phone, or just take a break and relax. You may minimize the data entry task but under no circumstances should you close the program. Closing the program may result in no payment for the session, with an option to come in again to repeat the session. Additionally, all devices must be muted while in session so you do not disturb the other research participants.
Today, we'd like you to practice the task for 10 minutes. I will come back after 10 minutes to turn off the task and schedule your sessions. "

Return after 10 minutes. Record these data on the participant's spreadsheet. Schedule subsequent session with the participant in the room used for greeting.

Appendix P

Covariate Session Script

Covariate Session for all participants:

Introductory sessions will begin in 2510 or 2512 Wood Hall:

The student investigator or the research assistant will read aloud the paragraphs below at the beginning of the initial session for each participant:

"For all future sessions, we will meet in this room or the room next door. Remember that before you go to the experimental room, make sure that any devices you do bring with you to the experimental room are completely silent in order not to disturb other participants in the study."

"During this 45-minute session, 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 $6.00 for this first session. We will pay you, in cash, at the end of the study for this session and every following session that you attend. The computer program will automatically stop once 45 minutes have passed and let you know when your session is over. It is important that you never close the computer program during any of your sessions. In order for the session to count, the computer program must have the full 45 minutes accounted for. However, this does not mean you need to work for the entire 45 minutes. You may take a break whenever you like for as long as you like. As a break, you may play one of the computer games, access the Internet, or use your cell phone, or you may also just stretch and relax. However, please be careful not to interrupt or disturb other participants. Remember, it is very important that you complete as many records as you can. Do you have any questions?"

"There is a job aid for the task located next to the computer just in case you have forgotten how to complete the task."

**The research assistant will take the participant to his or her workstation in the laboratory room (2532 Wood Hall), open the program on the computer, and prompt him or her to begin their work session.

**The research assistant observes the participant start their session.

End of Covariate Session:

**The research assistant waits until the participant's 45-minute session is over; the research assistant will then take the participant back to either 2510 or 2512 Wood Hall and remind the participant when his or her next session is.

Appendix Q

Incentive Pay System Training

“Before we get started today, I want to tell you how you will be paid for all of your remaining sessions. Once I have done so, I would like to make sure that you understand how you will be paid by giving you a short quiz. You must score 100% in order to pass, but you can take multiple versions of the test until you achieve that. If you don’t score 100% on 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 the same test. Do you have any questions?” [Answer any questions.]

“Today and for the rest of your sessions, you will be paid two cents 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 today session, you would earn $8.00. But notice that you are not being paid for records completed, but for correctly completed records. If you were to complete 400 records today, but only 350 of them were correctly completed, then you would earn $7.00. “

“Do you have any questions regarding how you will be paid? [Answer any questions.] Great, let’s have you take the quiz, now.”

Once the participant scores 100% on the quiz, ask if he or she has any questions and proceed to read the experimental session script

Incentive Pay System Training Quiz #1

Participants are allowed to use a calculator or calculator app on their cellphone during the quiz.

PAY SYSTEM:

Individuals are paid 2 cents for every medical data record correctly processed during the session. Answer the following questions based on the pay system.

1. James correctly processed 200 medical records during a session. How much money did James earn for that session?

2. Michelle processed 367 medical records during a session. 333 were correct. How much money did Michelle earn for that session?

3. Steve correctly processed 522 medical records during a session. How much money did Steve earn for that session?

Incentive Pay System Training Quiz #2

Participants are allowed to use a calculator or calculator app on their cellphone during the quiz.

PAY SYSTEM:

Individuals are paid 2 cents for every medical data record correctly processed during the session. Answer the following questions based on the pay system.

1. Dale correctly processed 534 medical records during a session. How much money did Dale earn for that session?

2. Miles processed 425 medical records during a session. 377 were correct. How much money did Miles earn for that session?

3. Jessica correctly processed 284 medical records during a session. How much money did Jessica earn for that session?

Appendix R

Debriefing Scripts

Goal-Setting with Fixed Pay
Debriefing Session Script:

**This script will be read aloud by the student investigator or a research assistant to each participant following the completion of the study.

Thank you for your participation in this study. As one last task, I would like to ask you to fill out this short survey about your experiences as a participant in the study. Is that something you are willing to do?"

****The research assistant will give the participant the survey.**

"Thank you for completing the survey!"

"Thank you again for your participation in the study. The reason for this session is so that I can provide a brief explanation of the purpose of the study that you have just completed. Feel free to ask any questions you have.

The purpose of the current study was to evaluate the effects of goal-setting and social comparison feedback on performance under hourly and incentive pay. You were in a condition in which you received hourly pay and goal-setting. There were (18-22) other people in your group who also received hourly pay and goal-setting".

There were three other conditions, one in which participants received incentive pay and goal-setting, second in which participants received hourly pay and social comparison feedback, and third condition in which participants received incentive pay and social comparison feedback. Social comparison feedback is when participants received a graph of their individual performance and the individual performances of other group members (show the sample SCF – individual performance for each individual graph).

We will be comparing the performance of individuals in these four groups."

****The research assistant will have a time sheet available that will be provided by the student investigator.**

*"I will now pay you for your participation. You completed four sessions during the study. You earned $6.00 for each session, thus you earned a total of $24 (*experimenter pays the participant*).*

Do you have any questions or concerns about this study or your participation at this time?

Thank you for your participation in this study and please do not discuss this study with anyone else because we are still in the process of debriefing other participants.

Goal-Setting with Incentive Pay
Debriefing Session Script:

**This script will be read aloud by the student investigator or a research assistant to each participant following the completion of the study.

Thank you for your participation in this study. As one last task, I would like to ask you to fill out this short survey about your experiences as a participant in the study. Is that something you are willing to do?"

****The research assistant will give the participant the survey.**

"Thank you for completing the survey!"

"Thank you again for your participation in the study. The reason for this session is so that I can provide a brief explanation of the purpose of the study that you have just completed. Feel free to ask any questions you have.

The purpose of the current study was to evaluate the effects of goal-setting and social comparison feedback on performance under hourly and incentive pay. You were in a condition in which you received incentive pay and goal-setting. There were (18-22) other people in your group who also received incentive pay and goal-setting".

There were three other conditions, one in which participants received hourly pay and goal-setting, second in which participants received hourly pay and social comparison feedback, and third condition in which participants received incentive pay and social comparison feedback. Social comparison feedback is when participants received a graph of their individual performance and the individual performances of other group members (show the sample SCF – individual performance for each individual graph).

We will be comparing the performance of individuals in these four groups."

****The research assistant will have a time sheet available that will be provided by the student investigator.**

*"I will now pay you for your participation. You completed four sessions during the study. Here's the number of medical records you correctly completed in each session along with the total number (show and give them the receipt). Each correctly completed record was worth 2 cents, thus you earned a total of X (*experimenter pays the participant*).*

Do you have any questions or concerns about this study or your participation at this time?

Thank you for your participation in this study and please do not discuss this study with anyone else because we are still in the process of debriefing other participants.

Social Comparison Feedback with Incentive Pay- Debriefing Session Script:

**This script will be read aloud by the student investigator or a research assistant to each participant following the completion of the study.

Thank you for your participation in this study. As one last task, I would like to ask you to fill out this short survey about your experiences as a participant in the study. Is that something you are willing to do?"

****The research assistant will give the participant the survey.**

"Thank you for completing the survey!"

"Thank you again for your participation in the study. The reason for this session is so that I can provide a brief explanation of the purpose of the study that you have just completed. Feel free to ask any questions you have.

The purpose of the current study was to evaluate the effects of goal-setting and social comparison feedback on performance under hourly and incentive pay. You were in a condition in which you received incentive pay and social comparison feedback. There were actually (18-22) other people in your group who also received incentive pay and social comparison feedback".

There were three other conditions, one in which participants received hourly pay and social comparison feedback, second in which participants received hourly pay and goal-setting, and third condition in which participants received incentive pay and goal-setting. Goal-setting feedback was when participants received a graph showing them their performance and then 5 goals to aim for (show the sample goal-setting graph).

We will be comparing the performance of individuals in these four groups."

****The research assistant will have a time sheet available that will be provided by the student investigator.**

"I will now pay you for your participation. You completed four sessions during the study. Here's the number of medical records you correctly completed in each session along with the total number (show and give them the receipt). Each correctly completed record was worth 2 cents, thus you earned a total of X (experimenter pays the participant).

Do you have any questions or concerns about this study or your participation at this time?

Thank you for your participation in this study and please do not discuss this study with anyone else because we are still in the process of debriefing other participants.

Social Comparison Feedback with Fixed Pay- Debriefing Session Script:

**This script will be read aloud by the student investigator or a research assistant to each participant following the completion of the study.

Thank you for your participation in this study. As one last task, I would like to ask you to fill out this short survey about your experiences as a participant in the study. Is that something you are willing to do?"

****The research assistant will give the participant the survey.**

"Thank you for completing the survey!"

"Thank you again for your participation in the study. The reason for this session is so that I can provide a brief explanation of the purpose of the study that you have just completed. Feel free to ask any questions you have.

The purpose of the current study was to evaluate the effects of goal-setting and social comparison feedback on performance under hourly and incentive pay. You were in a condition in which you received hourly pay and social comparison feedback. There were actually (18-22) other people in your group who also received hourly pay and social comparison feedback".

There were three other conditions, one in which participants received incentive pay and social comparison feedback, second in which participants received hourly pay and goal-setting, and third condition in which participants received incentive pay and goal-setting. Goal-setting feedback was when participants received a graph showing them their performance and then 5 goals to aim for (show the sample goal-setting graph).

We will be comparing the performance of individuals in these four groups."

****The research assistant will have a time sheet available that will be provided by the student investigator.**

*"I will now pay you for your participation. You completed four sessions during the study. You earned $6.00 for each session, thus you earned a total of $24 (*experimenter pays the participant*).*

Do you have any questions or concerns about this study or your participation at this time?

Thank you for your participation in this study and please do not discuss this study with anyone else because we are still in the process of debriefing other participants.

Appendix S

Receipt for Compensation

Compensation for Study Participation:

Date: _____

Participant number: _____

Number of correct medical records:

1st session:_____

2nd session:_____

3rd session:_____

4th session:_____

Total Records:_____

Total Payment:_____

Appendix T

Secondary Results Analyses for All Participants

Secondary Analysis for All Participants

Table 17 displays the means and standard deviations for the secondary dependent variables, the three factors that could have affected the primary dependent variable (correctly completed records).

Table 17

Means and Standard Deviations for Accuracy, Rate, and Time on Task – All Participants

		Accuracy		Rate		Time on Task	
Condition	*n*	Mean	*SD*	Mean	*SD*	Mean	*SD*
Goal-Setting and Fixed Pay	20	96.25%	3.69%	6.08	1.29	41.97	5.02
Social Comparison Feedback and Fixed Pay	22	94.73%	7.17%	6.21	1.77	41.96	5.62
Goal-Setting and Incentive Pay	19	96.20%	5.13%	6.24	1.65	40.40	5.84
Social Comparison Feedback and Incentive Pay	20	96.75%	2.86%	6.91	1.65	43.38	2.74

The relationships between the primary dependent variable and the secondary dependent variables were calculated using Pearson product moment correlations and the results are shown in Table 18. All correlations were significant, aside from the correlation between time on task and accuracy. There was a close to perfect positive correlation between correctly completed medical records and rate.

Questionnaire Analysis for All Participants

Eighty participants answered the post-study questionnaire. All questions used a Likert scale, where 1 = strongly disagree and 5 = strongly agree. Participants in all conditions answered four questions related to stress, motivation, and satisfaction. Table 19 shows the means and standard deviations for each of the four questions. Tables 20, 21, 22, and 23 display information

from the subsequent ANOVAs that were conducted to determine whether differences existed between the groups means. No significant difference was detected between the conditions for any of the four questions.

An extra question was included on the questionnaire for the SCF conditions to measure whether participants were uncomfortable having other people see their performance. As before, this question used a Likert scale, where 1 = strongly disagree and 5 = strongly agree. In the fixed pay condition, the mean rating for the question "I was uncomfortable having other people in my group see my performance" was 1.64 (*SD* = .95). The mean rating for the incentive condition was 1.63 (*SD* = 1.07). The mean ratings suggest that participants were not uncomfortable with other people being able to see how well they were performing. Table 24 displays the information from ANOVA that was conducted to see if there was a difference between the two conditions. No significant difference was detected.

Table 18

Correlations between the Primary and Secondary Dependent Variables – All Participants

	Time on Task	Rate	Accuracy
Correctly Completed Medical Records	.65*	.96*	.30*
Time on Task		.43*	.09
Rate			.36*

*$p < 0.01$

Table 19

Means and Standard Deviations for Stress, Motivation, and Satisfaction Questions – All Participants

		"I was stressed or anxious when performing the task"		"I did my best every session"		"I tried to improve my performance from session to session"		"I was satisfied with the pay system"	
Condition	*n*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
Goal-Setting and Fixed Pay	20	1.70	1.17	4.15	.67	4.45	.69	4.90	.31
Social Comparison Feedback and Fixed Pay	22	1.82	.91	3.77	1.31	4.46	.80	4.68	.57
Goal-Setting and Incentive Pay	18	1.83	.92	3.89	.76	4.44	.78	4.61	.61
Social Comparison Feedback and Incentive Pay	20	1.90	.85	4.21	.92	4.65	.59	4.40	.94
Overall	80	1.81	.97	4.00	.96	4.50	.72	4.65	.65

Table 20

ANOVA Source Table for "I was Stressed or Anxious When Performing the Task" – All Participants

Source	*df*	SS	MS	*F*	*p*
Treatment	3	.41	.14	.15	.932
Error	76	71.77	.94		
Total	79	72.19			

Table 21

ANOVA Source Table for "I Did My Best Every Session" – All Participants

Source	*df*	SS	MS	*F*	*p*
Treatment	3	2.65	.88	.96	.418
Error	75	69.35	.92		
Total	78	72.00			

Table 22

ANOVA Source Table for "I Tried to Improve My Performance from Session to Session" – All Participants

Source	*df*	SS	MS	*F*	*p*
Treatment	3	.60	.20	.39	.763
Error	76	39.40	.52		
Total	79	40.00			

Table 23

ANOVA Source Table for "I was Satisfied with the Pay System" – All Participants

Source	*df*	SS	MS	*F*	*p*
Treatment	3	2.55	.85	2.04	.115
Error	76	31.65	.42		
Total	79	34.20			

Table 24

ANOVA Source Table for "I was Uncomfortable Having Other People in My Group See My Performance" – All Participants

Source	*df*	SS	MS	*F*	*p*
Treatment	1	.0002	.0002	.00	.988
Error	39	39.51	1.01		
Total	40	39.51			