The Effects of Feedback on Hourly Pay and Individual Monetary Incentives

Douglas A. Johnson
THE EFFECTS OF FEEDBACK ON HOURLY PAY AND INDIVIDUAL MONETARY INCENTIVES

by

Douglas A. Johnson

A Thesis
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the
requirements for the
Degree of Master of Arts
Department of Psychology

Western Michigan University
Kalamazoo, Michigan
December 2005
ACKNOWLEDGMENTS

I'd like to offer my gratitude and thanks to the following individuals: To Alyce Dickinson, my advisor for casting a critical eye upon every paper I produced and strengthening my words with her careful insights. To Jack Michael and Bradley Huitema for providing their helpful input into the design and analysis of this study during the early stages. I’d like to thank John Austin for his helpful comments on the proposal version of this study. I’d also like to thank my research assistants who helped to actually make this study happen: Brian Lewis, Andrea Ibershoff, Jason Rockwell, Derek Wilkinson, Sarah VanStelle, Mike Lane, Pam Tava, Ryan DeWeese and Eric Bird. Kathy Culig deserves extra thanks for her help and flexibility during data collection. Thanks to my wife Sophie for her continual love and support. Finally, thanks to the International Society for Performance Improvement for graciously funding this research.

Douglas A. Johnson
THE EFFECTS OF FEEDBACK ON HOURLY PAY AND INDIVIDUAL MONETARY INCENTIVES

Douglas A. Johnson, M.A.
Western Michigan University, 2005

The effects of performance feedback when individuals received fixed or individual incentive pay were examined. A 2 X 2 factorial design was used with approximately 30 college students in each group. Participants attended six experimental sessions. They entered the cash value of simulated bank checks presented on a computer screen. Monetary incentives increased the number of correctly completed checks ($p = .000$); however feedback had no effect ($p = .825$). Time spent working and rate of performance correlated strongly with the number of checks completed correctly, suggesting that both influenced the checks completed correctly. The results suggest that incentives increase performance. They further suggest that feedback is unlikely to affect performance when it is provided without evaluation.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>ii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>v</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>METHOD</td>
<td>17</td>
</tr>
<tr>
<td>Participants</td>
<td>17</td>
</tr>
<tr>
<td>Setting</td>
<td>18</td>
</tr>
<tr>
<td>Apparatus</td>
<td>18</td>
</tr>
<tr>
<td>Dependent Variables</td>
<td>19</td>
</tr>
<tr>
<td>Independent Variables</td>
<td>20</td>
</tr>
<tr>
<td>Individual monetary incentive without feedback condition</td>
<td>20</td>
</tr>
<tr>
<td>Individual monetary incentive with in-session feedback condition</td>
<td>21</td>
</tr>
<tr>
<td>Fixed pay without feedback condition</td>
<td>21</td>
</tr>
<tr>
<td>Fixed pay with in-session feedback condition</td>
<td>22</td>
</tr>
<tr>
<td>Experimental Design</td>
<td>22</td>
</tr>
<tr>
<td>Statistical Analysis</td>
<td>22</td>
</tr>
<tr>
<td>Experimental Procedure</td>
<td>23</td>
</tr>
<tr>
<td>Random assignment</td>
<td>23</td>
</tr>
<tr>
<td>Introductory session</td>
<td>23</td>
</tr>
<tr>
<td>Pre-test session</td>
<td>24</td>
</tr>
<tr>
<td>Experimental sessions</td>
<td>25</td>
</tr>
</tbody>
</table>
# Table of Contents--Continued

**RESULTS** .............................................................................................................. 26  
**DISCUSSION** ......................................................................................................... 32  
**REFERENCES** ....................................................................................................... 48  

**APPENDICES**

A. Recruitment Flyer ............................................................................................... 58  
B. Recruitment Script ............................................................................................... 60  
C. Self-Report Questionnaire .................................................................................. 62  
D. Pay System Quizzes ............................................................................................ 64  
E. HSRIB Research Approval Letter ........................................................................ 67  
F. Satisfaction and Stress Questionnaires ............................................................... 69  
G. Instructional Scripts ............................................................................................ 74  
H. Participant Form for Number of Checks Completed Correctly ....................... 77  
I. Debriefing Script .................................................................................................. 80
LIST OF TABLES

1. Raw Means for Number of Correctly Completed Checks ........................................ 26
2. Adjusted Means for Number of Correctly Completed Checks ................................ 26
3. Source Table for Analysis of Covariance ............................................................... 27
4. Percentage of Checks Completed Correctly ............................................................ 27
5. Number of Checks Completed Per Minute .............................................................. 28
6. Minutes Spent on Task .......................................................................................... 28
7. Pearson Correlations Between the Primary DV and Secondary DVs .................. 29
8. Means for Satisfaction Ratings ............................................................................ 29
9. Means for Stress Ratings ...................................................................................... 30
10. Source Table for the Analysis of Variance for Satisfaction Ratings ................... 30
11. Source Table for the Analysis of Variance for Stress Ratings .............................. 31
Introduction

A series of surveys conducted in 1987, 1990 and 1993 revealed that individual incentive plans were used in approximately 90% of Fortune 1000 companies (Ledford, Lawler, & Mohrman, 1995). A more recent study by Kuhn and Yockey (2003) demonstrated that individuals prefer variable pay systems, so long as the pay system is based on individual performance. The prominence of individual incentive systems in business is an indicator that they should be considered an important research topic for organizational behavior management researchers. In spite of this, however, empirical research has been sparse. For example, in 1998, Jenkins, Gupta, Mitra, and Shaw were able to identify only 39 studies for their meta-analytic review of the effects of individual financial incentives on performance.

Similarly, when Bucklin and Dickinson (2001) reviewed the effects of different types of individual monetary systems, they were able to identify only three thematic lines of research, with only a few studies in each thematic line. They found five studies that had systematically examined the effects of the percentage of base pay or total pay that was incentive-based, eight that had examined the effects of various fixed and ratio schedules of incentive delivery, and two that had examined the effects of linear, accelerating and decelerating piece-rate pay on performance.

Consistent with the general literature (for reviews, see Bucklin & Dickinson, 2001; Dickinson & Gillette, 1993; Jenkins et al., 1998), monetary incentives improved performance in comparison to hourly pay in each thematic line of research (Bucklin & Dickinson, 2001). However, performance was undifferentiated across variations in the incentive percentage (as long as the percentage was greater than 0%), the ratio schedule
of delivery, and the amount of the per piece incentive. Hantula (2001) arrived at similar conclusions in his review of the effects of schedules of reinforcement on organizational behavior. Moreover, his review included studies that examined both monetary and non-monetary performance consequences.

Bucklin and Dickinson (2001) noted that frequent performance feedback was available to participants in most of the studies they reviewed, leading them to restrict their conclusions to situations where incentives are combined with frequent feedback. Further, they proposed that the performance feedback might have been the reason why performance did not differ under the aforementioned manipulations.

Performance feedback has historically been and continues to be the most common intervention in Organizational Behavior Management (OBM), with 65% - 70% of the interventions using either feedback alone or in combination with other interventions (Balcazar, Shupert, Daniels, Mawhinney, & Hopkins, 1989; Bucklin, Alvero, Dickinson, Austin, & Jackson, 2000; Nolan, Jarema, & Austin, 1999). In spite of this, there is no agreed-upon definition of performance feedback.

Most definitions of feedback used within the discipline of psychology have been derived from cybernetics and systems theory (Duncan & Bruwelheide, 1985-86; Peterson, 1982). Duncan and Bruwelheide, who traced the history of the use of the term performance feedback, stated, “The concept of feedback commonly used in Psychology has emerged from the field of cybernetics” (p. 93). In this conceptualization, “feedback allows for error correction in that the information about the present state or functioning of a system is used to control the future state or functioning of that system” (p. 93). Adapting this type of systems approach to human performance systems, Brethower
(1972, p. A-1) defined feedback as “Information about past performance which is used to guide future performance.” Similarly, Connellan (1978) defined feedback as information about present or past performance that is communicated to the individual employee, presumably in a way that will influence future performance. Daniels (2000) defined it as “information about performance that allows an individual to adjust his or her performance” (p. 101). Rummler and Brache (1995) defined feedback as information that tells performers what and how well they are doing, later saying that “Feedback [sic] tells a performer to change performance or to keep on performing the same way” (p. 72); and, more recently, Goodman, Wood, and Hendrickx (2004), defined it as information that signals errors to help guide performers in performing appropriately.

While these definitions differ, they do have common features. First, the performance feedback itself is a physical stimulus, the form of which (written, oral, graphic) depends on past performance. Past can be defined broadly, ranging from a few seconds past (such as in the case of a running tally of production numbers) to several months past (as is typical with performance appraisals). The critical feature is that the form of the stimulus is directly related to past performance. Second, the stimulus is designed or used to “guide,” “influence,” or “adjust” future performance.

Definitions of feedback do not always include this latter component. For example, noting that definitions of feedback differ within the field, Alvero, Bucklin, and Austin (2001), in their review of feedback, provided the following two examples along with others: “. . . (a) information that is given to persons regarding the quantity or quality of their past performance (Prue & Fairbank, 1981), (b) information transmitted back to the responder following a particular performance (Sulzer-Azaroff & Mayer, 1991). . . ” (pp.
Thus, it could be argued that feedback can be adequately defined without reference to its potential effects on subsequent performance. Yet, consistent with the systems or cybernetic roots of the term feedback, implicit in most definitions is that the information about past performance enables performers to adjust their on-going or future performance. Therefore, the formal definition of feedback that will be adopted in this paper is: *A stimulus, the form of which depends upon past performance, that is designed or used to guide on-going or future performance.*

It should be noted that this definition as well as the aforementioned ones are *formal,* rather than *functional* definitions. That is, information about past performance that is designed to guide, affect or influence future performance may not do so; nonetheless, such information will still be called feedback, as has commonly been done in the past. The current definition, however, excludes stimuli that cannot influence subsequent performance. To illustrate: when employees are fired from their jobs, it is typical that they are provided reasons for their dismissal. Although such reasons are typically comprised of information about past performance, they cannot guide future performance, at least not within the same organization. Moreover, even if individuals are told in advance that they will receive such information, the information cannot, per se, affect performance because it has not yet been delivered. Nonetheless, it should also be recognized that because individuals are told in advance that they will be given such information, their performance could well be affected by the knowledge that their performance is being monitored. That is not, however, the same thing as being affected by the “information about past performance.”
Regardless of how it is defined, feedback remains one of the most used and effective interventions in OBM, along with incentives. A recent article by Ross (2003), for example, listed incentives and feedback as two of the seven important drivers of performance.

A number of studies have consistently demonstrated that the simultaneous implementation of monetary incentives and feedback will improve performance. A study by Shikdar and Das (2003) showed significant productivity differences for a fish-trimming task in a large fish processing plant due to the implementation of monetary incentives and feedback. Improvements were about 40% and 58% for the two experimental groups receiving monetary incentives and feedback compared to a control group receiving no monetary incentives or feedback. Similarly, LaMere, Dickinson, Henry, Henry, and Poling (1996) conducted a study that examined the performance of truck drivers for a variety of work tasks. Following the implementation of a monetary incentive and feedback package, performance increased and was maintained during a four-year follow-up.

Frisch and Dickinson (1990) also studied the implementation of monetary incentives and feedback but did so in a laboratory simulation. Participants assembled parts made of nuts, bolts and washers in an hourly pay with feedback condition or an incentive pay with feedback condition. Participants performed significantly better in the incentive pay with feedback condition than in the hourly pay with feedback condition, producing about 30% more parts.

It is also possible that the famous Hawthorne Effect can be explained by the addition of monetary incentives and feedback. In a careful reanalysis of the Hawthorne
studies, Parsons (1974) noted that it is often overlooked that information feedback and a new contingent financial reward system were implemented prior to the performance improvements seen in the first Relay Assembly Test Room study.

There have also been a number of studies demonstrating how monetary incentives have improved performance when feedback systems were already in place. For example, Gaetani, Hoxeng, and Austin (1985) improved the performance of two machinists when they added monetary incentives to feedback. They utilized an ABAC design, in which A = baseline, B = feedback, and C = feedback with commission compensation. When the participants self-monitored their own performance in the B condition (feedback alone), their performance levels approximately doubled. When the C condition (feedback with monetary incentives) was later implemented, performance increased once again and was higher than performance during the feedback only condition.

Dierks and McNally (1987) reported similar results with proof operators at a bank. The measured performance consisted of the number of checks processed in an hour by each proof operator. Initially, the employees processed an average of 1065 items/hour. After implementing a weekly feedback graph, the performance level of the proof operators rose sharply to 2100 items/hour. Management then added a monetary incentive system, and as a result, performance rose even further, until the employees were processing an average of 3500 items/hour.

The above data are consistent with the results of review articles that have examined the effectiveness of feedback interventions. In an early review of the literature, Balcazar, Hopkins, and Suarez (1985-86) discovered that when tangible rewards, such as money, food and gasoline, were used to supplement feedback, the performance of all
participants improved in 13 of 15 OBM applications. In contrast, when feedback was used alone, the performance of all participants improved in only 13 of 47 applications. Similarly, a more recent literature review found that when feedback was combined with consequences, the effects were more consistent than when feedback was used alone, although the differences were not as pronounced as those reported by Balcazar et al. (Alvero et al., 2001).

Although studies have documented that monetary and non-monetary tangible rewards often enhance the effectiveness of feedback, few studies have examined whether feedback enhances the effectiveness of monetary and non-monetary rewards. Moreover, as will be discussed later, the results of those studies have been inconclusive. In addition to being practically important, the question of whether feedback enhances the effectiveness of monetary and non-monetary tangible rewards is conceptually interesting because performance contingent rewards are themselves a form of performance feedback. Yet, a number of authors have discussed why feedback may indeed enhance the effectiveness of behavioral consequences (Balcazar et al., 1985-86; Bucklin, McGee, & Dickinson, 2003; Duncan & Bruwelheide, 1985-86; Fairbank & Prue, 1982; Kang, Oah, & Dickinson, 2003).

One possibility is that feedback may function as a discriminative stimulus (SD). Balcazar et al. (1985-86) suggested that feedback might initially function as an SD because of generalization from a person’s reinforcement history. That is, historically, behavior may have been differentially consequated when feedback was present and when it was absent. Therefore, when feedback is first presented along with extant behavioral consequences, it may evoke higher levels of performance. The higher levels of
performance may then be maintained by additional consequences, which, in the case of monetary incentives, would be the additional money earned in incentives.

Another possible explanation is that feedback may function as a conditioned reinforcer due to a history of feedback being delivered at the same time as other reinforcers. Feedback may also function as an establishing operation (Bucklin et al., 2003; Duncan & Bruwelheide, 1985-86; Peterson, 1982). That is, feedback may increase the reinforcing value of work accomplishments and may evoke work performance that results in those accomplishments.

Additionally, in many situations, feedback is provided more frequently and more immediately than performance contingent rewards and incentives. Immediacy and frequency have long been known to influence the effectiveness of behavioral consequences (Braksick, 2000; Brown, 1982; Daniels, 1989; Petrock, 1978). Thus, feedback may improve performance because it is more immediate and frequent than the rewards themselves, yet linked to those rewards.

Some authors have noted that the manner in which feedback is typically delivered violates the definitions of discriminative stimuli and conditioned reinforcers (Agnew, Dickinson, Acker, Cronin, & Goldwater, 1992; Agnew & Redmon, 1992; Peterson, 1982). Namely, even though performance feedback is often more frequent and immediate than organizational rewards and incentives, there are temporal delays that are still too great for feedback to effectively function as either an SD or conditioned reinforcer. Instead, these authors have suggested the effects of feedback can best be explained in terms of rule control (Malott, 1992). Such rules will be more effective if feedback is differentially correlated with some consequence (Kang et al., 2003). Thus, all of the
preceding analyses suggest that feedback will be more effective when it is correlated with functional, differential consequences such as monetary incentives.

It is also the case that rules about the receipt of delayed rewards may control behavior more effectively when frequent, immediate feedback is provided. For example, the feedback may prompt employees to state the following rule, “I have earned $5.00 in incentives. If I produce more, I will earn even more money.” For detailed discussions of how rules might control behavior, readers are referred to Agnew and Redmon (1992) and Malott (1992).

As noted earlier, Parsons (1974) cited the implementation of information feedback and a new contingent financial reward system as potentially responsible for performance improvements seen in the first Relay Assembly Test Room experiment in the Hawthorne studies. He compared the results of that study to the results of a second study conducted in the Relay Assembly Test Room. The second study resembled the first, except that feedback was not provided to the assemblers. Similar to the first experiment, production rates in the second experiment rose immediately when the new pay system was introduced. Unlike the first experiment, production rates in the second experiment did not rise during the 8-week period of time that the new pay system was in effect, nor were production rates as high as in the first study. Such data suggest the possibility that feedback augments the effects of monetary incentives.

Agnew (1991) examined the augmentative effects of feedback on individual monetary incentives in an unpublished study. She used an ABA design, in which the A condition consisted of monetary incentives only and the B condition consisted of monetary incentives plus feedback. The experimental task, modeled after the job of a
proof operator in a bank, involved typing the monetary value of checks into a computer. Unfortunately, the results did not provide any definitive evidence due to the fact that feedback improved the performance of only two of the four participants, and even those performance gains were small. Additionally, caution is warranted when interpreting the results because the incentives did not appear to control the performance of some of the participants (Bucklin et al., 2003). That is, some of the participants failed to perform well enough to earn the incentives for several sessions during the A condition when incentives were provided alone. Such control is necessary in order to assess whether feedback enhances the effectiveness of the incentives.

Smoot and Duncan (1997) also investigated the effects of individual monetary incentives with and without feedback. In their study, monetary incentives and feedback were initially provided to participants for constructing parts made from pop beads. The feedback was then removed. The performance of the participants actually increased when the feedback was removed. This unusual result can possibly be accounted for by the fact that during the feedback condition participants physically tallied the number of parts they produced. This procedure reduced the amount of time available for making the parts, which is an important confound, particularly given that the sessions were only 15 minutes.

In a more recent study, Bucklin et al. (2003) tried to better isolate the effects that feedback has on individual monetary incentives. They employed an ABAC design, in which A = monetary incentives, B = monetary incentives with feedback, and C = hourly pay with feedback. They used a computer work simulation task called SYNWORK (Elsmore, 1994). SYNWORK presented participants with four different work tasks
simultaneously; an arithmetic task, a memory task, a visual monitoring task, and an auditory monitoring task. Participants earned points for correct responses. The performance of six of the seven participants increased when feedback was added to the monetary incentives. While feedback improved performance, the performance of the participants did not reverse when the feedback was removed in the second A condition, thus limiting the conclusions that could be drawn.

It is possible, as suggested by Bucklin et al. (2003), that the feedback resulted in higher levels of performance that were then maintained by the incentives. It is also possible, again as suggested by the authors, that the self-produced feedback or environmental changes initiated by the feedback procedure could not be removed. For example, participants reported anecdotally that the feedback made them more aware of the amount of time they spent performing the task, their overall speed of responding, and the amount of time they allocated to the various sub-tasks, which affected how many points they earned. Because such self-produced stimuli and/or environmental stimuli associated with the time spent performing the task were correlated with more money, they may have functioned as conditioned establishing operations, discriminative stimuli and/or conditioned reinforcers, maintaining performance once the feedback was removed.

Ultimately, there haven’t been any methodologically sound, peer-reviewed publications clearly documenting the effect that performance feedback has on a monetary incentive system. In fact, there has been a paucity of research on this topic in general. That is, an extensive literature search did not produce any study that examined how performance feedback influenced the effectiveness of other behavioral consequences.
There are several possible reasons for this lack of research. One is that a performance feedback system is typically implemented first because it is easier and less costly to implement than a monetary incentive system or other type of reward system. It may also be that the experimenters are primarily interested in demonstrating the effectiveness of the monetary incentives and behavioral consequences. Another possible reason is that in some cases, performance feedback and incentives or behavioral consequences are delivered as a package because the experimenters are more interested in improving performance than in isolating the effects of the component variables. Also, it is possible that when incentives are implemented first, the gains are sufficient enough that further improvements are not typically sought.

Nonetheless, this is still an important research area. If performance feedback does improve the gains made by monetary incentives then there are several important implications. Foremost, it would mean that feedback should be added to any existing monetary incentive systems already in place. Most organizations do not provide feedback to their employees even though they pay incentives (Buyniski, 1995). Another implication is that this may help explain the non-differential responding obtained across variations in performance-pay systems; specifically, across variations in the percentage of total and base pay earned in incentive pay, the ratio schedule of incentive delivery, and the amount of the per piece or unit of work incentive (Bucklin & Dickinson, 2001). That is, if feedback does enhance the effectiveness of monetary incentives, it would lend support to Bucklin and Dickinson’s suggestion that feedback might have been responsible for maintaining performance under these variations in performance-pay systems.
If feedback does not improve the gains made by a monetary incentive system then there are other implications to consider. Perhaps most importantly, it may suggest that feedback is an unnecessary component in work settings and that any extra work or cost in implementing feedback is unjustified. Organizations might be better served by using only a well-designed monetary incentive system if their reason for implementing feedback is to improve performance. As for the line of research on variations in performance-pay systems, this would suggest that researchers would need to search for a new explanation to account for the non-differential performance.

The purpose of this study was to investigate whether performance feedback enhances the effectiveness of monetary incentives. In order to increase the likelihood of demonstrating an effect, a very objective and specific form of continuous feedback was used. If this type of feedback did not have an effect, it is unlikely that less specific and more delayed feedback would improve performance on the targeted task. If the feedback in the current study did enhance performance, then subsequent research would need to be conducted to determine the limits of the effect.

Unlike the previous studies (Agnew, 1991; Bucklin et al., 2003; Smoot & Duncan, 1997) this study employed a group design. There were several reasons for the adoption of a between group design rather than a within subject design. First, as indicated earlier, in Bucklin et al.’s study, although the performance of six of the seven participants improved when feedback was added to the incentives, performance failed to reverse when it was removed. As noted by Bucklin et al.:

... it may be that when higher levels of performance are achieved and rewarded by more money, performance may come under the control of the
additional monetary incentives and response-produced stimuli correlated with the additional incentives. If these analyses are correct, then a within-subject reversal design is not an appropriate design to use in this research.

(p. 22)

Also, in organizational settings, monetary incentive systems are typically implemented for an entire work group and the performance of the group overall, not the individual, is of primary concern. Thus, the group may be the most appropriate unit of analysis.

The current study controlled for two potential confounds that might eliminate performance differences under the incentive condition and feedback conditions: the lack of attractive alternative activities and the presence of the experimenter (Bucklin et al., 2003; Matthews & Dickinson, 2000). Mawhinney (Mawhinney, 1975, 1984; Mawhinney & Mawhinney, 1982) has repeatedly pointed out that individuals are likely to maximize their work performance under a particular schedule of reinforcement if alternative sources of reinforcement are weak. With respect to the current investigation, if not provided with attractive alternatives, participants might work at maximum rates, regardless of the presence or absence of feedback, because there is nothing better to do. This differs from a typical work setting where a variety of alternative activities compete, often effectively, with work. In the current study, seven computer games served as alternative tasks.

Computer games have been used as alternative tasks in prior incentive studies and shown to result in off-task behavior (Bucklin et al., 2003; Matthews & Dickinson, 2000). Additionally, computer games have ecological validity as off-task activities. Workers have access to computer games at their work stations, and several studies have shown
that they do play computer games as alternatives to working, which hurts their productivity (Betts, 1995; Eng & Schwartz, 1993; Klett, 1994). As in Matthews and Dickinson, the time spent performing alternative tasks was recorded to determine whether any changes in performance were due to changes in the time spent performing the work task.

Also, in work settings, supervisors often punish nonproductive behavior and reinforce productive behaviors. The presence of a supervisor may then come to exert control over productive work behaviors. That is, workers may be more productive in the presence of the supervisor than in his/her absence. It is possible that this kind of stimulus control will generalize to the presence of an experimenter and thus control behavior in a similar fashion. In work settings, supervisors do not spend much of their time observing the performance of their workers (Komaki, 1986; Komaki, Zlotnick, & Jensen, 1986). Thus, the presence of an experimenter may unrealistically inflate work performance levels, eliminating performance differences that might otherwise occur under different experimental conditions. To control for this confound, the experimenter was not present during experimental sessions in the current study.

It is important to select a work task for which feedback would be useful. This requires the use of a work task in which high volumes of work units are produced, so that performers cannot monitor their own progress accurately. To elaborate: if one used refrigerator assembly as the work task and the performer could only produce two refrigerators during a session, then telling the performer he or she produced two refrigerators does not supply any feedback that couldn’t already be easily self-generated. It would also make it impossible to withhold feedback, an important consideration for
control conditions. Therefore this experiment utilized a work task in which hundreds of work units are typically produced during a single session.

As mentioned earlier, performance contingent rewards themselves are a form of feedback. Thus, in the current study, the pay conditions were explained to the participants before they began the study but participants were not paid until the end of the 7-session study (1 pre-test session, 6 experimental sessions). This pay procedure prevented the performance feedback inherent in incentive pay from influencing the performance of participants in the incentive pay/no feedback condition. On the other hand, it should be noted that the performance of participants was under instructional control during the study rather than control by the actual pay contingencies.
Method

Participants

One hundred and twenty three university students enrolled at Western Michigan University participated in this study. Participants were recruited through the use of posted flyers and in-class announcements in several undergraduate classes. A copy of the flyer can be found in Appendix A. A copy of the script for the in-class announcement can be found in Appendix B. Participants were excluded if they indicated that they had taken or were currently enrolled in PSY 444, Industrial/Organizational Behavior Analysis or PSY 344, Organizational Psychology. This is because the effects of monetary incentives and feedback on work performance and worker satisfaction are taught in these courses and this knowledge could well have influenced how participants responded in the current study.

Participants were selected for inclusion on the basis of having indicated an interest in at least one of seven computer games listed on a self-report questionnaire. Participants also indicated that they played one of these games at least one hour per month. A copy of the self-report questionnaire can be found in Appendix C.

Another requirement for inclusion was that participants be able to pass a short quiz about the incentive or fixed pay system to ensure they understand it. Potential participants who were tentatively assigned to an incentive pay condition took a quiz about the incentive pay system; participants who were tentatively assigned to a fixed pay condition took a quiz about the hourly pay system. Copies of the two quizzes can be found in Appendix D. A score of 100% was considered passing, although potential participants were be allowed to take the quiz up to two times, if necessary.
A final requirement for inclusion was that participants be able to meet scheduling requirements, i.e., attend three 45-minute sessions per week.

Participants were paid for their participation in this study. The method of payment is described in the “Independent Variables” and “Experimental Procedure” sections. Only participants who signed a consent form approved by Western Michigan University’s Human Subjects Institutional Review Board (HSIRB) were included in the study. The HSIRB research approval letter is provided as Appendix E.

Setting

The experimental setting consisted of one of three small rooms, each of which contained a personal computer, and a university laboratory across the hall. The three rooms were located in 2510, 2512, and 2514 Wood Hall. The university laboratory was located in 2532 Wood Hall. Each participant had a work area in the small room that consisted of an adjustable chair, computer, keyboard, mouse, and gel palm rest. The laboratory across the hall was used to greet participants. Also, at the end of experimental sessions, participants were escorted back to the laboratory to confirm their next scheduled session.

Apparatus

The experimental task consisted of a check-proofing task, similar to the job of a proof operator at a bank. A computer simulation program displayed a graphic of a check with a randomly generated dollar amount. The participant then entered the dollar amount using the keypad and pressed the Enter button to generate another check.
Each computer had seven computer games available for play at all times: Tetris, Hearts, Pinball, Solitaire, Spider Solitaire, FreeCell, and Minesweeper. Job aids with instructions on how to play each game were available next to each computer.

**Dependent Variables**

The primary dependent measure was the average number of checks completed correctly per session. The primary dependent measure could potentially be affected by three other factors: the amount of time the individual spent on task, how accurately the individual worked while on task and how quickly the individual worked while on task. Thus, the following three measures served as secondary dependent variables: (a) the average number of minutes spent performing the task per session, (b) the average percentage of checks completed correctly per session, and (c) the average number of checks completed correctly per minute per session, i.e., the rate of correct check completion while the participant worked on the task.

The computer automatically recorded (a) the total number of checks completed per session, (b) the number of checks completed correctly per session, and (c) the number of seconds spent off-task, i.e., the number of seconds that the individual did not perform the experimental task. Time off-task was recorded as follows: if a participant spent 10 seconds not engaged in the experimental task, the computer began recording time as off-task. Once the participant began using the experimental task again, the computer stopped recording time off-task until another 10-second interval of inactivity passed. A user was recorded as active if the experimental task was the current active window and either the mouse or keyboard was in use. At the end of the session the total number of seconds
spent off-task was subtracted from the session length to obtain the amount of time spent on-task.

The percentage of checks completed correctly was calculated by dividing the number of checks completed correctly by the total number of checks completed correctly and multiplying by 100. The rate of correct check completion was calculated by dividing the number of checks completed correctly by the number of minutes spent on-task.

At the end of every session after the participant had left, the experimenter saved that session’s data onto a disk and also manually wrote down the session data. This was done to prevent the loss of data in case of a computer malfunction.

In addition, after their last experimental session, participants were asked to complete a questionnaire that assessed their satisfaction with the pay system and how stressful they found it to be. There were four experimental conditions, as indicated below, and participants assigned to each condition completed the questionnaire that was relevant to that condition. The four questionnaires are provided in Appendix F.

**Independent Variables**

The independent variables were the pay system (fixed vs. individual monetary incentive pay) and feedback (the presence or absence of continuous in-session feedback). There were four experimental conditions: individual monetary incentive without feedback, individual monetary incentive with in-session feedback, fixed pay without feedback, and fixed pay with in-session feedback.

**Individual monetary incentive without feedback condition.** Incentives were calculated by multiplying the total number of checks completed correctly by a participant during a session by \$.006. Participants earned \$5.75 (the amount of the per session fixed
pay) if they completed 958 checks correctly. This equivalency was based on the average performance of participants who were paid individual incentives in a pilot study.

Participants were paid in cash at the end of the study. The reason for the delayed payment was that if participants were paid during the study, then this would have added a confounding variable. Namely, the payment amount could have potentially functioned as an effective form of feedback.

The instructional script that was read to participants before they began their first session is provided in Appendix G.

*Individual monetary incentive with in-session feedback condition.* This condition was the same as the individual monetary incentive condition, except for the addition of in-session feedback. This feedback consisted of an on-screen display indicating the total number of checks completed correctly at that point in the session and the participant’s current rate of check completion (average number of checks completed correctly per minute). The rate was updated every thirty seconds. The instructional script that was read to participants before they began their first session is provided in Appendix G.

*Fixed pay without feedback condition.* This condition was the same as the individual monetary incentive condition without feedback condition, except that participants did not earn incentives for the number of checks completed correctly. Instead, they were paid $5.75 per session regardless of performance.

At the beginning of the study, participants were told that the experimenter would tell them the number of checks they completed correctly each session after their last session. Although employees who are paid hourly in actual work settings do not typically receive such information about their performance, the reason for doing this was to control
for the fact that participants in the incentive without feedback condition received this information after their last session, and hence knew that their performance was being monitored. Awareness of performance monitoring could have influenced performance. Telling participants in this group (fixed pay without feedback) that they would be told the number of checks they completed correctly at the end of the study controlled for the fact that the other three groups were aware that their performance was being monitored. The instructional script that was read to participants before they began their first session is provided in Appendix G.

*Fixed pay with in-session feedback condition.* This condition was the same as the fixed pay without feedback condition, except for the addition of in-session feedback. The in-session feedback was the same as the feedback described in the individual monetary incentive with in-session feedback condition. The instructional script that was read to participants before they began their first session is provided in Appendix G.

**Experimental Design**

A 2 × 2 factorial design was used. The participants were randomly assigned to one of the four groups. The fixed pay with in-session feedback condition contained thirty participants. The other three conditions contained thirty-one participants each.

**Statistical Analysis**

A two-factor ANCOVA was used to determine whether the average number of checks completed correctly by participants in the four experimental groups differed. The average number of checks completed correctly during a pre-test session was used as the covariate. This covariate controlled for keyboard proficiency. Pearson product moment correlations were used to determine the strength of the relationship between the average
number of checks completed correctly per session and three of the secondary dependent measures: (a) the average number of minutes spent performing the task per session, (b) the average percentage of checks completed correctly per session, and (c) the average number of checks completed correctly per minute per session. A two-factor ANOVA was used to assess differences between groups for satisfaction and stress ratings.

Experimental Procedure

Random assignment. Consent forms differed for participants assigned to the incentive pay conditions and the participants assigned to the fixed pay conditions so that participants who received incentives would not know that other participants were receiving fixed pay and vice versa. Because the consent forms differed, the experimenter randomly assigned the 123 participants to one of the four experimental conditions before introductory sessions were conducted. The experimenter utilized the computer program Excel for random assignment using a procedure described by Shadish, Cook, and Campbell (2002).

Potential participants were tentatively assigned a participant number so that the experimenter could give the participant the correct consent document. If a potential participant signed the consent document and met the eligibility requirements, the participant number was permanently assigned to him or her. If not, that participant number was tentatively assigned to the next potential participant.

Introductory session. The experimenter sought consent from participants during the introductory session. If consent was obtained, the experimenter then assessed the participant’s eligibility to participate. If participants met the eligibility requirements the
The experimenter explained the task and appropriate pay procedures (incentive pay or fixed pay procedures) to participants.

The experimenter then administered the quiz to test the participant’s understanding of the relevant pay system. Participants who did not pass the quiz were paid $5.75 for attending the session and dismissed. Participants who passed the quiz, scoring 100% after a maximum of two attempts, were scheduled for experimental sessions and then allowed to complete the pre-test session (described shortly). After completing the pre-test session the participants were paid $5.75 (in cash) for attending the introductory session.

*Pre-test session.* All participants attended one 45-minute pre-test session. Participants earned $5.75 for completion of the pre-test session. The number of checks completed correctly was used as a covariate to control for differences in initial keyboard proficiency.

Participants met the experimenter in the Performance Management Laboratory, Wood Hall, Room 2532. The following instructions were given to participants at the beginning of the pre-test session: “People have very different keyboard skills. During this first session, we want to determine your skill level. Therefore it is very important that you work as hard as you can. You will earn $5.75, and we will pay you the money you earn at the end of the study. Please leave your personal belongings in this room. Also, if you have a cell phone or pager, please turn it off and leave it off during the session. If you need anything, just come get me – I will be in this room. I will come and stop the session after 45 minutes. Again, please try to complete as many checks as you can. Do you have any questions?”
Checklists were employed during the pre-test session to ensure proper implementation of the procedures. At the end of the session such checklists were filled out by the experimenter conducting the session.

Experimental sessions. Participants attended a total of six 45-minute experimental sessions over a two-week period. As with the pre-test sessions, participants met the experimenter in the Performance Management Laboratory, Wood Hall, Room 2532. Before the first experimental session, the experimenter instructed participants using the instructional scripts provided in Appendix G.

At the end of every session, the experimenter informed the participants that the session was over and confirmed the next scheduled session. As with pre-test sessions, checklists were employed during experimental sessions to ensure proper implementation of the procedures.

After participants completed their last session, the experimenter told them how many checks they had completed correctly each session and how many total checks they completed correctly during the study. The forms that the participants were given are provided in Appendix H. The experimenter then paid participants in cash. The experimenter then debriefed the participants about the study and thanked them for their participation. A copy of the debriefing script can be found in Appendix I.
Results

Table 1 displays the raw means and standard deviations for the average number of checks completed correctly during experimental sessions for all four experimental groups. Table 2 displays the adjusted means for these data, based on the ANCOVA analysis.

Table 1

Raw Means for Number of Correctly Completed Checks

<table>
<thead>
<tr>
<th>Feedback Variable</th>
<th>In-Session Feedback</th>
<th>No Feedback</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pay System</td>
<td>Mean $SD$</td>
<td>Mean $SD$</td>
<td>Mean $SD$</td>
</tr>
<tr>
<td>Incentive</td>
<td>815.1 187.8</td>
<td>743.1 182.6</td>
<td>779.1 187.3</td>
</tr>
<tr>
<td>Fixed</td>
<td>560.4 256.1</td>
<td>547.5 220.2</td>
<td>553.9 236.6</td>
</tr>
<tr>
<td>Overall</td>
<td>687.7 256.6</td>
<td>645.3 223.6</td>
<td></td>
</tr>
</tbody>
</table>

Table 2

Adjusted Means for Number of Correctly Completed Checks

<table>
<thead>
<tr>
<th>Feedback Variable</th>
<th>In-Session Feedback</th>
<th>No Feedback</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pay System</td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>Incentive</td>
<td>772.6</td>
<td>754.8</td>
<td>763.7</td>
</tr>
<tr>
<td>Fixed</td>
<td>567.4</td>
<td>571.4</td>
<td>569.4</td>
</tr>
<tr>
<td>Overall</td>
<td>670.0</td>
<td>663.1</td>
<td></td>
</tr>
</tbody>
</table>

Table 3 shows the source table for the results of the ANCOVA. The obtained difference of 6.9 checks for the feedback variable was not statistically significant ($F = 0.05, p = 0.825$). The obtained difference of 194.3 checks for the pay system variable was
statistically significant at the .001 level ($F = 39.46, p = 0.000$), with a standardized effect size of .91. No significant interactions were present.

Table 3

Source Table for Analysis of Covariance

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covariate</td>
<td>1</td>
<td>1996032</td>
<td>1996032</td>
<td>68.87</td>
<td>0.000</td>
</tr>
<tr>
<td>Feedback Variable (A)</td>
<td>1</td>
<td>1420</td>
<td>1420</td>
<td>0.05</td>
<td>0.825</td>
</tr>
<tr>
<td>Pay System (B)</td>
<td>1</td>
<td>1143729</td>
<td>1143729</td>
<td>39.46</td>
<td>0.000</td>
</tr>
<tr>
<td>A X B</td>
<td>1</td>
<td>3642</td>
<td>3642</td>
<td>0.13</td>
<td>0.724</td>
</tr>
<tr>
<td>Error</td>
<td>118</td>
<td>3419746</td>
<td>28981</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>122</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4 displays the means and standard deviations for the percentage of checks completed correctly for all groups.

Table 4

Percentage of Checks Completed Correctly

<table>
<thead>
<tr>
<th>Feedback Variable</th>
<th>In-Session Feedback</th>
<th>No Feedback</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pay System</td>
<td>Mean $SD$</td>
<td>Mean $SD$</td>
<td>Mean $SD$</td>
</tr>
<tr>
<td>Incentive</td>
<td>98.35 1.01</td>
<td>98.51 0.83</td>
<td>98.43 0.92</td>
</tr>
<tr>
<td>Fixed</td>
<td>97.26 3.21</td>
<td>97.98 1.44</td>
<td>97.62 2.48</td>
</tr>
<tr>
<td>Overall</td>
<td>97.80 2.41</td>
<td>98.25 1.19</td>
<td></td>
</tr>
</tbody>
</table>

Table 5 displays the means and standard deviations for number of checks completed per minute for all groups.
Table 5

Number of Checks Completed Per Minute

<table>
<thead>
<tr>
<th>Feedback Variable</th>
<th>In-Session Feedback</th>
<th>No Feedback</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pay System</td>
<td>Mean  SD</td>
<td>Mean  SD</td>
<td>Mean  SD</td>
</tr>
<tr>
<td>Incentive</td>
<td>19.6 3.6</td>
<td>18.2 3.6</td>
<td>18.9 3.6</td>
</tr>
<tr>
<td>Fixed</td>
<td>17.5 3.7</td>
<td>17.2 3.0</td>
<td>17.3 3.3</td>
</tr>
<tr>
<td>Overall</td>
<td>18.6 3.8</td>
<td>17.7 3.3</td>
<td></td>
</tr>
</tbody>
</table>

Table 6 displays the means and standard deviations for the amount of time spent on task for all groups.

Table 6

Minutes Spent on Task

<table>
<thead>
<tr>
<th>Feedback Variable</th>
<th>In-Session Feedback</th>
<th>No Feedback</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pay System</td>
<td>Mean  SD</td>
<td>Mean  SD</td>
<td>Mean  SD</td>
</tr>
<tr>
<td>Incentive</td>
<td>42.1 4.6</td>
<td>41.4 5.0</td>
<td>41.7 4.8</td>
</tr>
<tr>
<td>Fixed</td>
<td>32.0 11.1</td>
<td>31.6 10.6</td>
<td>31.8 10.8</td>
</tr>
<tr>
<td>Overall</td>
<td>37.0 9.8</td>
<td>36.5 9.6</td>
<td></td>
</tr>
</tbody>
</table>

Table 7 displays the Pearson correlations between the average number of checks completed correctly and the three secondary dependent measures: average percentage of checks correct, average number of checks completed per second, and the average amount of time spent on task. All three correlations were statistically significant at the .001 level. The relationship between the number of checks completed correctly and the percentage of
checks correct was weak. A strong relation was seen between the number of checks completed correctly and both the number of checks completed per second and the time spent on task.

Table 7

Pearson Correlations Between the Primary DV and Secondary DVs

<table>
<thead>
<tr>
<th>Number of Checks Completed Correctly Correlated with:</th>
<th>$r$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of Checks Correct</td>
<td>0.299</td>
<td>0.001</td>
</tr>
<tr>
<td>Number of Checks Completed Per Second</td>
<td>0.791</td>
<td>0.000</td>
</tr>
<tr>
<td>Time Spent on Task</td>
<td>0.849</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table 8 displays the means and standard deviations for the satisfaction ratings for all groups. Table 9 displays the means and standard deviations for the stress ratings for all groups.

Table 8

Means for Satisfaction Ratings

<table>
<thead>
<tr>
<th>Feedback Variable</th>
<th>In-Session Feedback</th>
<th>No Feedback</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pay System</td>
<td>Mean $SD$</td>
<td>Mean $SD$</td>
<td>Mean $SD$</td>
</tr>
<tr>
<td>Incentive</td>
<td>1.81 1.14</td>
<td>1.84 1.04</td>
<td>1.82 1.08</td>
</tr>
<tr>
<td>Fixed</td>
<td>1.83 1.44</td>
<td>1.58 1.12</td>
<td>1.71 1.28</td>
</tr>
<tr>
<td>Overall</td>
<td>1.82 1.29</td>
<td>1.71 1.08</td>
<td></td>
</tr>
</tbody>
</table>
Table 9

Means for Stress Ratings

<table>
<thead>
<tr>
<th>Feedback Variable</th>
<th>In-Session Feedback</th>
<th>No Feedback</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pay System</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Incentive</td>
<td>1.58</td>
<td>0.77</td>
<td>1.68</td>
</tr>
<tr>
<td>Fixed</td>
<td>1.27</td>
<td>0.52</td>
<td>1.26</td>
</tr>
<tr>
<td>Overall</td>
<td>1.43</td>
<td>0.67</td>
<td>1.47</td>
</tr>
</tbody>
</table>

Table 10 displays the source table for the results of the ANOVA for the satisfaction ratings. Neither of the main effects was statistically significant. Table 11 displays the source table for the results of the ANOVA for the stress ratings. The main effect of the feedback variable was not statistically significant. The main effect of the pay system was statistically significant at the .01 level \( (F = 9.81, p = 0.002) \). No significant interactions were present.

Table 10

Source Table for the Analysis of Variance for Satisfaction Ratings

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback Variable</td>
<td>1</td>
<td>0.373</td>
<td>0.373</td>
<td>0.26</td>
<td>0.609</td>
</tr>
<tr>
<td>Pay System</td>
<td>1</td>
<td>0.411</td>
<td>0.411</td>
<td>0.29</td>
<td>0.591</td>
</tr>
<tr>
<td>A X B</td>
<td>1</td>
<td>0.624</td>
<td>0.624</td>
<td>0.44</td>
<td>0.508</td>
</tr>
<tr>
<td>Error</td>
<td>119</td>
<td>168.747</td>
<td>1.418</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>122</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 11

Source Table for the Analysis of Variance for Stress Ratings

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback Variable (A)</td>
<td>1</td>
<td>0.0598</td>
<td>0.0598</td>
<td>0.14</td>
<td>0.707</td>
</tr>
<tr>
<td>Pay System (B)</td>
<td>1</td>
<td>4.1333</td>
<td>4.1333</td>
<td>9.81</td>
<td>0.002</td>
</tr>
<tr>
<td>A X B</td>
<td>1</td>
<td>0.0853</td>
<td>0.0853</td>
<td>0.20</td>
<td>0.653</td>
</tr>
<tr>
<td>Error</td>
<td>119</td>
<td>50.1247</td>
<td>0.4212</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>122</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Discussion

As Tables 2 and 3 indicate, the use of a performance-based pay system resulted in a significant improvement in performance, relative to a fixed pay system. Table 7 indicates that the improvement in performance occurred primarily as a result of participants spending more time on task and working faster when they were on task. The addition of feedback, however, resulted in no significant performance gains for participants, regardless of the pay system that was implemented.

These results imply that organizations would be better served by spending more time developing and implementing performance-based pay systems than the type of feedback system implemented in the current study. This suggestion is consistent with the recommendation made by Balcazar et al. (1985-86) about feedback systems in general: “The most fundamental recommendation resulting from this review is that the most effective approach to improving important behaviors in organizations is the establishment of systems of functional differential consequences” (p. 83). The effects of feedback are, however, complex, and certain qualifications relating to the type of feedback used in the current study and the nature of the experimental task need to be examined.

The main purpose of this study was to determine whether feedback would elevate incented performance due to its correlation with increased earnings. It did not do that. One interpretation of these findings is that participants performed at maximum levels when paid incentives, and thus were unable to perform any higher. While possible, this interpretation is rendered less likely due to the fact that participants in the fixed pay with feedback condition did not perform better than those in the fixed pay without feedback condition.
Feedback did not increase performance when participants received fixed pay. These results seem to be inconsistent with the results of many studies that have documented performance-enhancing effects of feedback (Alvero et al., 2001; Balcazar et al., 1985-86; Kopelman, 1986). However, numerous authors have recognized that feedback does not have uniformly positive effects on performance (Alvero et al., 2001; Balcazar et al., 1985-86; Ilgen, Fisher, & Taylor, 1979; Latham & Locke, 1991).

The inconsistent effects of feedback are not surprising given that feedback interventions vary widely, yet are still collectively referred to as “feedback” (e.g., Ford, 1980; Ilgen et al., 1979; Peterson, 1982; Prue & Fairbank, 1981). For example, in 1981, Prue and Fairbank stated, “Unfortunately, the proliferation of interventions generically labeled as performance feedback has not been accompanied by empirical distinctions between different types of feedback strategies. That is, the term performance feedback has been applied to a wide range of behavioral interventions that are often quite different” (p. 3). Peterson (1982) cogently argued that feedback is a physical stimulus and, as such, can have all of the possible behavioral effects of any stimulus, depending upon situational and historical factors. He further asserted: “It [feedback] is not a new principle of behavior and it does not refer to a specific procedure; it at best has simply become professional slang” (p. 102). Similarly, Ilgen et al. (1979) stated, “The diverse elements subsumed under the single rubric of feedback may share the property of conveying some degree of information about past behavior, but they share little else. As a result, many factors often are confounded with the feedback stimulus, which makes it difficult, if not impossible, to ascertain the effects of feedback per se on behavior” (p. 349).
Several researchers have proposed factors that can influence whether feedback will affect performance. Four that are particularly relevant to the current study include: (a) the extent to which feedback is correlated with functional differential rewards (e.g., Balcazar et al., 1985-86; Duncan & Bruwelheide, 1985-86; Ilgen et al., 1979; Prue & Fairbank, 1981); (b) the extent to which feedback includes an evaluative component (e.g., Ilgen et al., 1979; Kopelman, 1986; Prue & Fairbank, 1981); (c) the specificity of the feedback (e.g., Annett, 1969; Ilgen et al., 1979; Kopelman, 1986; Prue & Fairbank, 1981); and (d) the nature of the task (Annett, 1969; Baumeister, Hutton, & Cairns, 1990).

In the current study, feedback was correlated with functional differential consequences for the incented group but not for the fixed pay group. Because the investigation was designed to examine whether performance feedback per se would increase incented performance, the feedback procedure was restricted to information about task performance (number of checks completed, number of checks completed correctly, and speed of performance). Experimenters were explicitly instructed not to provide any evaluative statements to participants about their performance. This was done because the evaluative statements (i.e., praise and criticism) might have acted as functional consequences for participants in and of themselves. Thus, the results of the study could not have been attributed solely to the feedback procedure. This analysis has important implications for the interpretation of the present results. Namely, that performance feedback absent evaluation may not increase performance, regardless of whether wages are performance-contingent or fixed.

A closer look at many previous studies reveals that the delivery of feedback is often accompanied with the delivery of evaluative statements. That is, supervisors or co-
workers provide praise or criticism based upon the feedback. For example, studies by Brown and Sulzer-Azaroff (1994) and Wilson, Boni, and Hogg (1997) reported interventions involving feedback alone. However, in both studies the managers who delivered the feedback also provided praise for improved performance. In the case of Fox and Sulzer-Azaroff (1989), even though there were no reported instances of praise, individuals delivering feedback were instructed never to provide negative comments. With such instructions, it seems likely that individuals would provide praise for correct performance.

Some studies that have examined "feedback only" interventions have attempted to eliminate evaluative statements by supervisors during feedback. For example, Anderson, Crowell, Doman, and Howard (1988) publicly posted performance when team leaders were not present. However, the posting was not anonymous and therefore team members could view and identify each other's graphs. It is quite possible that peers provided evaluative statements to each other based upon performance. Calpin, Edelstein, and Redmon (1988) attempted to control for evaluative statements by instructing supervisors to refrain from commenting on feedback. No data were taken on whether or not supervisors actually complied with these instructions, however. When people are instructed to provide feedback to others, it is difficult to ensure that evaluative statements, unintended or otherwise, are not provided. In the absence of treatment integrity measures, it may be erroneous to assume that supervisors did not at least provide some form of subtle praise or criticism during feedback.

Brown et al. (1981) found that feedback alone resulted in no lasting increases in the desired behavior. However, when approval was later added to the feedback, the desirable behaviors increased greatly and were maintained at high levels. Crowell et al. (1988) instituted a feedback alone condition, in which managers were instructed to provide individual numerical scores without evaluation. Unlike the Calpin et al. (1988) study mentioned above, treatment integrity measures were taken to ensure that feedback was delivered without evaluation. Performance did not reach the minimal desired levels during the feedback alone condition. However, when a feedback plus social praise condition was implemented, performance did exceed the minimal desired levels, suggesting that praise was necessary for maximum performance improvement.

In actual work organizations, it is extremely difficult to determine whether a feedback intervention is, in fact, a feedback alone intervention. This is especially the case when supervisors provide the feedback, as in the above field studies. Employees have a history in which their supervisors have evaluated their performance (at least typically). Given that such an evaluation has, in the past, been correlated with contingent consequences (at least to some degree), even though the performance-reward contingency for the newly targeted performance may not be explicitly explained or stated, the supervisory feedback may “act much like a more formal change in an employees’ [sic] job description or contract. The overall impact is ‘to notify’ employees of the new or now to be enforced contingencies operating in the organization” (Prue & Fairbank, 1981, p. 12). This notification, of course, implies evaluation.

Thus, despite the fact that the authors of many field studies and later reviewers (e.g., Alvero et al., 2001; Balcazar et al., 1985-86) have labeled interventions as
"feedback alone" interventions, other controlling variables remain quite plausible. Chapanis (1964) and Das (1982) conducted laboratory studies that support the position that feedback alone will not affect performance.

Chapanis (1964) attempted to isolate the "purely motivational effect of knowledge of performance from its informational and rewarding aspects" (p. 263). College students, who were paid hourly, punched digits into a teletype tape one hour a day for 24 days. To increase the realism of the task, they were told that they were programming a computer. The research assistant deliberately acted as though she did not care how well participants performed. In two of three feedback groups, participants could see a counter that tallied every stroke. In the third feedback group, participants were required to write down their output three times during the one-hour session. None of the feedback groups performed better than a group that did not receive feedback.

In the study by Das (1982), college students drilled holes in steel connector plates using a drill press. Sessions lasted one hour. One group received feedback on the number of holes they drilled. This quantitative feedback was provided by an electric counter during the session. Another group received the quantitative feedback along with qualitative feedback (percentage of good holes punched) every fifteen minutes. Neither group performed better than a control group that did not receive any type of feedback. However, a group that received both types of feedback along with a production standard performed significantly better than the control group. Further, two groups that received production standards ("normal" or "hard") without feedback did not perform better than the control group. Thus, only the group that received performance standards and feedback
performed significantly better than the control group that received neither. Participants in these comparison groups were paid hourly.

When performance standards are provided, as they were in Das’ (1982) study, they imply that the performance of individuals will be evaluated against this standard. Thus, his results are consistent with the contention that feedback will not be effective unless some type of evaluation is implied or explicitly provided along with it. It is also not surprising that combining feedback with goal setting (that enables evaluation of performance) has generally been found to improve performance more than either alone (Daniels, 1989; Fellner & Sulzer-Azaroff, 1984; Ilgen et al., 1979; Muchinsky, 2003).

Interestingly, in keeping with this analysis, most current definitions of “performance feedback” (as opposed to “knowledge of results”) imply some type of evaluative or comparative component, as did the cybernetic and systems theoretical roots of the term. For example, as noted in the introduction, Daniels (2000) defined feedback as “information about performance that allows an individual to adjust [italics added] his or her performance” (p. 101). Similarly, Rummler and Brache (1995) defined it as “information that tells performers what and how well [italics added] they are doing” (p. 66). Finally, in their excellent review, Ilgen et al. (1979) stated, “Thus, we conclude that feedback is information about appropriateness [italics added] of past performance” (p. 351).

Evaluative feedback may influence performance for at least three reasons. First, stimuli correlated with “good” performance (i.e., the evaluative feedback itself) may themselves function as conditioned reinforcers for some individuals, almost irrespective of the situation. This can result when individuals have a history of reinforcement in
which such signs of competence have been frequently and repeatedly correlated with valued rewards and benefits (and stimuli associated with incompetence have been correlated with disadvantageous consequences) (Skinner, 1953). Second, praise and criticism may function as conditioned reinforcers for some individuals, again due to a history of reinforcement in which praise and criticism has been frequently and consistently correlated with valued rewards (or punishers) (Skinner, 1953). Historically, others have referred to this role of feedback as influencing a person’s “competence” or “achievement” motivation (Ilgen et al., 1979; Kopelman, 1986).

Perhaps more importantly, in work settings, evaluative statements from managers are often explicitly or implicitly correlated with the receipt of other valued organizational rewards or, in the case of negative evaluations, the lack thereof and aversive consequences. Many have emphasized the importance of this correlation. For example, Ilgen et al. (1979) indicated that the effectiveness of a supervisor’s feedback depends upon the extent to which the supervisor can control valued rewards. Kopelman (1986) stated that one reason why feedback motivates improved task performance is because “it can lead to the anticipation of gaining (or losing) external rewards,” broadly referring to this as “evaluation apprehension” (p. 138).

When feedback is correlated with valued rewards, it can come to function as an antecedent stimulus as well as a consequence (Balcazar et al., 1985-86; Duncan & Bruwelheide, 1985-86; Kopelman, 1986; Prue & Fairbank, 1981). Evaluative feedback, in particular, clarifies the relationship between performance and rewards by specifying performance levels that will (and will not) result in rewards (Ilgen et al., 1979; Kopelman, 1986). Thus, it may prompt higher levels of performance and bring
employees into contact with the contingent relationship between their performance and rewards. It should be noted, however, that the higher levels of performance would not be sustained unless organizational consequences were, indeed, commensurate with performance (Prue & Fairbank, 1981).

The present study employed a computer delivered feedback system, and therefore reduced the possibility of evaluative statements from experimenters. And, as indicated earlier, experimenters were instructed and reminded not to make evaluative statements. Nor did the feedback itself indicate how well the participant was performing the task. Thus, the feedback procedure did not contain an evaluative component. The results of this study therefore lend credibility to the position that feedback without an evaluative component is likely to be ineffective. The implication is that it is not the numbers and data themselves that are important. Rather, it is what others say about those numbers and data that is important for altering performance.

The unique contribution of this study is the implication that feedback may have to be coupled with some type of evaluation in order to affect performance even when the feedback is correlated with performance-contingent pay. This may also be true for other types of functional differential consequences as well.

There is, however, an important caveat. The effects of evaluative feedback will be more pervasive if the feedback is correlated with the receipt of valued rewards in the current setting. Otherwise, the effects are likely to vary from individual to individual, depending upon the extent to which evaluative statements and signs of competence have been paired with valued rewards in the individual’s past. Said another way, without correlation with performance-contingent rewards, the effects of evaluative stimuli will
depend upon extent to which they have become generalized conditioned reinforcers for individuals in and of themselves (as discussed above).

The specificity of the feedback used in the current study could also have influenced the results (Annett, 1969; Connellan, 1978; Daniels, 1989; Ilgen et al., 1979; Kopelman, 1986; Prue & Fairbank, 1981). When listing guidelines for providing performance feedback, some authors have stated that feedback must specify what behaviors an individual must change in order to improve (Connellan, 1978; Daniels, 1989). This was not done in the present study. If it had been perhaps a significant effect would have been obtained from the addition of feedback. For example, participants could have been told if they should work faster, work more often, or be more careful with data entry to improve their performances. Future studies should consider investigating this possibility.

The nature of the task may also have contributed to the results. In the present study, participants were already proficient, or at least relatively proficient, with data entry and keyboarding tasks, and therefore could readily identify correct performance. Thus, the feedback might have been superfluous (Baumeister et al., 1990). If that was the case, the possibility remains that this type of feedback might be effective in situations involving training and skill acquisition in which correct performance is not so easily identified (Alavoisus & Sulzer-Azaroff, 1990; Annett, 1969). However, it should also be noted that this analysis is speculative. The properties of the task that influence the effectiveness of feedback have not yet been empirically determined.

As noted in the introduction, the present study has implications for research investigating the non-differential performance obtained across variations in the
percentage of total and base pay earned in incentives, the ratio schedule of delivery, and the amount of the per piece incentive. Bucklin and Dickinson (2001) had previously suggested that feedback might have been responsible for equalizing performance across conditions. The lack of a significant effect due to the presence of feedback suggests that researchers need to investigate alternative explanations to account for the non-differential performance.

Satisfaction did not differ across either the pay or feedback conditions. Historically, comparisons of employee satisfaction with different types of pay systems have been mixed, regardless of whether comparisons were made between hourly pay systems and incentive pay systems or between different types of incentive pay systems (Bucklin & Dickinson, 2001; Dickinson & Gillette, 1993). Only a few studies have examined whether feedback alone affects satisfaction and the results, once again, have been inconsistent, and thus hard to interpret (Das, 1982; Das & Mital, 1994; Shikdar & Das, 2003).

One factor that has been shown to influence satisfaction ratings with various experimental conditions is whether participants were exposed to only one or all of the conditions (Bucklin & Dickinson, 2001; Dickinson & Gillette, 1993). For example, in studies conducted by Pritchard and his colleagues (Pritchard, Hollenbeck, & DeLeo, 1980; Pritchard, Leonard, Von Bergen, & Kirk, 1976), participant satisfaction with different pay systems differed depending upon whether participants had been exposed to all of the systems. When participants were exposed to only one of the pay systems, satisfaction ratings did not differ. However, when participants were exposed to all of the pay systems differences emerged. Thus, it is possible that differences in satisfaction
would have occurred if participants in the current study had been exposed to the different pay and feedback conditions.

Anecdotally, there was some evidence for potential differences in satisfaction, at least with respect to feedback. During debriefing, when participants in the monetary incentives without feedback group were informed that half of the participants had received feedback, most expressed that they would have preferred to have feedback. However, this preference was not reflected in the actual ratings of satisfaction.

Participants in the fixed pay groups rated their amount of stress as less than participants in the incentive pay groups. Thus, it appears that individuals find incentives systems more stressful than hourly pay systems. A more stressful pay system could affect employee acceptance, and as Honeywell-Johnson, McGee, Culig, and Dickinson (2002) pointed out, employee acceptance of a pay system is critical to its success. However, it should be noted that even though participants in the Honeywell et al. (2002) study found the individual incentive system to be more stressful, those participants still expressed a preference for individual incentives over hourly pay. Similar results were obtained by McGee and Dickinson (2005) and Culig, Johnson, and Dickinson (2005). In both studies the majority of participants rated incentive pay as more stressful than hourly pay, yet the majority of participants still expressed higher levels of satisfaction and preference for the incentive pay systems. It appears that even though incentive pay systems are more stressful, they still evoke greater positive reactions from participants.

It is not surprising that in the current study participants in the fixed pay groups rated the fixed pay system as less stressful than participants in the incentive pay groups. The stress ratings were, in fact, very low for the fixed pay participants (mean = 1.26, $SD$
Fixed pay participants did not have any performance requirements. And, as stated previously, experimenters withheld evaluative comments. This is not representative of fixed pay systems in actual work settings, where there is typically some minimum expectation of performance for continued employment. Skinner (1969), for example stated:

No one works Monday morning because he is reinforced by a paycheck on Friday afternoon. The employee who is paid by the week work during the week to avoid losing a standard of living which depends upon a weekly wage. A supervisor who can discharge him is an essential part of the system. Rate of work is determined by the supervisor... and special aversive contingencies maintain quality. The pattern is therefore still aversive. (p. 18)

In the current study, aversiveness and stress associated with minimum performance requirements and supervisory criticism were absent.

There were two reasons why minimum performance standards were not used in the present study. First, they may have inflated the performance of participants in the fixed pay without feedback condition. The task was such that performers could not easily monitor their own performance (i.e., participants correctly completed an average of 667 checks per 45-minute session). Thus, if their pay was contingent upon completing a minimum number of checks (such as 800 checks), it is possible they would have worked harder than otherwise to ensure payment. Second, participants would not have received any pay for sessions in which they failed to meet the standard. Because participants were not given any feedback on their performance until the end of the study (i.e., after they had
completed the six experimental sessions), they would have been unaware that they failed to perform adequately enough to be paid. This seemed ethically undesirable.

There are limitations to generality of the results obtained in this study. The fact that this was a laboratory simulation does limit the degree to which one can assume generality to actual work settings. Furthermore, the manner in which feedback was provided in this study is not representative of how feedback is provided in work settings. Computer delivered feedback was used in the present study in an attempt to eliminate the presence of evaluation and better identify causal variables. As discussed earlier, in most work settings a person typically delivers feedback and it is likely that such feedback includes some degree of evaluation. If feedback in real work settings nearly always includes components of both data and evaluation, then the relevance of feedback consisting of data alone may be questionable.

Another limitation concerns the rule-governed nature of this study. Given that participants did not receive any incentives until the conclusion of their participation, it may be difficult to argue that incentives directly controlled performance. This may also be problematic for the incentive pay plus feedback group, who never actually contacted the correlation between incentive pay and feedback. Instead, it is likely that verbal statements participants made covertly actually controlled performance, and the exact nature of these self-statements is not well understood. Further, given that no efforts were made to assess or measure these self-statements, the role of rule-governed control is speculative.

The preceding conclusions regarding the role of evaluation are also speculative since this study did not attempt to utilize evaluation as an independent variable. Only
further experimentation can determine whether or not such speculations have an empirical basis. Ultimately, this study can only demonstrate that the type of feedback used did not increase performance and that the reasons for this are unknown.

This study is primarily important because it suggests that feedback alone does not improve performance even when it is correlated with functional differential rewards such as performance-contingent pay. However, feedback is an area that gives rise to many complex questions. How do the effects of feedback alone, evaluation alone, and feedback with evaluation compare? Would evaluative feedback combined with incentives improve performance beyond just incentives alone? If evaluation is found to be an important controlling variable, what are the parameters of effective evaluation? Would providing feedback that shows performance is above or below some goal or performance standard be sufficient for evaluation to effectively influence behavior? Or is it necessary for evaluation to include some kind of praise or criticism, either from supervisors or peers? The answers to these questions are likely to vary widely depending on the individual.

As Peterson (1982) points out, feedback is just another stimulus, and without the proper pairing history, it should not have any influence on behavior. Feedback must be correlated with other stimuli in order to influence behavior, but the nature of those other stimuli might vary widely. Feedback that increases behavior may do so because of a correlation with rewards, approval, praise, safe conditions (i.e., “I’m not about to be fired”), or some combination of the above. For example, correlating positive feedback with approval may be sufficient to allow feedback to improve performance in individuals whose behaviors are easily reinforced by approval. In fact, evaluative statements alone may be sufficient to improve performance for certain individuals. However, for other
individuals, feedback may be necessary to make evaluative statements seem credible. In other words, so that evaluative statements don’t just seem like someone’s subjective opinion, but are instead backed up with data. For such individuals, evaluative statements alone may not be sufficient to improve performance. Thus, the controlling variable would actually be a compound stimulus consisting of feedback and evaluation, and the individual components may be ineffective by themselves. Whether or not feedback, or some compound stimulus including feedback as a component, is effective at influencing performance seems to greatly depend on the reinforcement history of the individual. These histories are likely to vary greatly, and as a result, it seems that group measures are probably best for continued work in this line of research. Only then could interventions be recommended that are likely to work for the average performer in business and industry.
References


Culig, K. M., Johnson, D. A., & Dickinson, A. M. (2005, May). The effects of individual monetary incentives with individual feedback and group monetary incentives with group feedback on high performance. In G. A. Matthews (Chair), *Current advances in OBM research: The effects of monetary incentives and feedback on organizational performance*. Symposium conducted at the meeting of the Association for Behavior Analysis, Chicago, IL.


Smoot, D. A., & Duncan, P. K. (1997). The search for optimum individual monetary incentive pay system: A comparison of the effects of flat pay and linear and non-
linear pay systems on worker productivity. *Journal of Organizational Behavior Management, 17*(2), 5-75.

Appendix A

Recruitment Flyer
Research Participants Needed

I am looking for individuals to participate in a study designed to determine how well individuals perform a data entry task under various conditions. The data entry task simulates the job of a proof operator at a bank and consists of entering numbers using the numeric keypad on a computer.

Participants will be paid for participating in this study. While the amount of pay will vary, participants are likely to receive $4.00 - $8.00 per session. To be eligible to participate, you must play computer games at least one hour a month. You are not eligible to participate if you have taken or are currently enrolled in PSY 344 or PSY 444.

Sessions will be conducted in Wood Hall. The study will last three weeks (seven sessions total). In addition, potential participants will need to attend an introductory session prior to the beginning of the study.

If you are interested in learning more about this study, please contact Doug Johnson. Be sure to provide your name, e-mail address or telephone number, and the times you can be reached.

All information is confidential.

Thank you!

For more information contact Doug Johnson:

E-mail: douglas.johnson@wmich.edu
or
Phone: (269) 599-3668
Appendix B

Recruitment Script
Recruitment Script

Hi. My name is Doug Johnson and I am a doctoral student in psychology at Western Michigan University. I am looking for individuals to participate in a study designed to determine how well individuals perform a data entry task under various conditions. The data entry task simulates the job of a proof operator at a bank and consists of entering numbers using the numeric keypad on a computer. Computer games will also be available during the sessions if individuals want to play them. The study will be conducted in Wood Hall on WMU's campus.

If you are currently enrolled in or have completed either PSY 444, Industrial/Organizational Behavior Analysis or PSY 344 Organizational Psychology, you are not eligible to participate because what you learned in those classes could influence your performance. In addition, you must play computer games at least one hour per month to be eligible to participate.

Sessions will be 45 minutes and you will be asked to attend 8 sessions over a 3-week period. The amount of money you will earn will depend upon the conditions in the study, but it is likely that you will earn from $4.00 to $8.00 per session.

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 at a later time will not affect your grade in this or any other class.

If you would like to learn more about this study, please print your name, phone number or email address, whichever is most convenient for you, on a sheet of paper and give it to me. I am also handing out a sheet of paper with my name, telephone number and email address, and you can contact me by telephone or email if you prefer.

I will contact you within the next few days to arrange a time when we can meet to discuss the details of the study.

Thank you!
Appendix C

Self-Report Questionnaire
Please complete the following questions. All information you provide will remain confidential.

1. Have you taken, or are currently taking, either of the following classes?

   PSY 344, Organizational Psychology  ___ Yes  ___ No
   PSY 444, Industrial/Organizational Behavior Analysis  ___ Yes  ___ No

2. Do you play any of the following computer games?

   Tetris  ___ Yes  ___ No
   Solitaire  ___ Yes  ___ No
   Pinball  ___ Yes  ___ No
   Minesweeper  ___ Yes  ___ No
   Hearts  ___ Yes  ___ No
   Spider Solitaire  ___ Yes  ___ No
   FreeCell  ___ Yes  ___ No

3. If you play any of the games listed above, how often do you play?

   1  2  3  4  5  6  7  8  9 times a day
   1  2  3  4  5  6  7  8  9 days a week
   1  2  3  4  5  6  7  8  9 times a month

4. On average, how many hours a month do you play computer games?

   Less than 1  2  3  4  5  6  7  8  9  10  10+ hours

5. Do you know anyone that has signed up to participate in the study? If so, please list their names.

Thank you!
Appendix D

Pay System Quizzes
Pay System Quiz

PAY SYSTEM:
   Individuals are paid $.006 for every check correctly processed during the session.

Answer the following questions based on the pay system.

1. James correctly processed 1050 checks during a session. How much money did James earn for that session?

2. Michelle correctly processed 200 checks during a session. How much money did Michelle earn for that session?

3. Steve correctly processed 625 checks during a session. How much money did Steve earn for that session?
PAY SYSTEM Quiz

PAY SYSTEM:
Individuals are paid $5.75 per session.

Answer the following questions based on the pay system.

1. James correctly processed 1050 checks during a session. How much money did James earn for that session?

2. Michelle correctly processed 200 checks during a session. How much money did Michelle earn for that session?

3. Steve correctly processed 625 checks during a session. How much money did Steve earn for that session?
Appendix E

HSRIB Research Approval Letter
Date: September 3, 2004

To: Alyce Dickinson, Principal Investigator
   Douglas Johnson, Student Investigator for thesis

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

Re: HSIRB Project Number: 04-08-09

This letter will serve as confirmation that your research project entitled “The Effects of Individual Monetary Incentives With and Without Feedback” 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 that you may only conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. 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.

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

Approval Termination: September 3, 2005
Appendix F

Satisfaction and Stress Questionnaires
Participant Number __________

Satisfaction and Stress Questionnaire
Incentive System

1. How satisfied were you with the incentive pay system?

□ Completely satisfied
□ Mostly satisfied
□ Somewhat satisfied
□ Neither satisfied nor dissatisfied
□ Somewhat dissatisfied
□ Mostly dissatisfied
□ Completely dissatisfied

2. How stressful did you find the incentive pay system?

□ Not at all stressful
□ A little stressful
□ Somewhat stressful
□ Very stressful
□ Extremely stressful
Participant Number ____________

Satisfaction and Stress Questionnaire
Incentive and Feedback System

1. How satisfied were you with the incentive pay and feedback system?

☐ Completely satisfied
☐ Mostly satisfied
☐ Somewhat satisfied
☐ Neither satisfied nor dissatisfied
☐ Somewhat dissatisfied
☐ Mostly dissatisfied
☐ Completely dissatisfied

2. How stressful did you find the incentive pay and feedback system?

☐ Not at all stressful
☐ A little stressful
☐ Somewhat stressful
☐ Very stressful
☐ Extremely stressful
Satisfaction and Stress Questionnaire
Fixed Pay System

1. How satisfied were you with the fixed pay system?
   □ Completely satisfied
   □ Mostly satisfied
   □ Somewhat satisfied
   □ Neither satisfied nor dissatisfied
   □ Somewhat dissatisfied
   □ Mostly dissatisfied
   □ Completely dissatisfied

2. How stressful did you find the fixed pay system?
   □ Not at all stressful
   □ A little stressful
   □ Somewhat stressful
   □ Very stressful
   □ Extremely stressful
Participant Number _________

Satisfaction and Stress Questionnaire
Fixed Pay and Feedback System

1. How satisfied were you with the fixed pay and feedback system?

☐ Completely satisfied
☐ Mostly satisfied
☐ Somewhat satisfied
☐ Neither satisfied nor dissatisfied
☐ Somewhat dissatisfied
☐ Mostly dissatisfied
☐ Completely dissatisfied

2. How stressful did you find the fixed pay and feedback system?

☐ Not at all stressful
☐ A little stressful
☐ Somewhat stressful
☐ Very stressful
☐ Extremely stressful
Appendix G

Instructional Scripts
Individual Monetary Incentive Without Feedback Condition

I want to remind you that you will earn $.006 for each check you complete correctly and I will pay you in cash at the end of the study. I will also tell you how many checks you completed correctly during each session at the end of the study. Once again, please leave your personal belongings and books in this room and, if you have a cell phone or pager, turn it off during the session. You may take a break whenever you like for as long as you like. You may play one of the computer games as a break, or you may also just stretch and relax. After I start the check task in the experimental room, I will leave the room and be in this room. If you need anything during the session, just come get me. Do you have any questions?

Individual Monetary Incentive With In-Session Feedback Condition

I want to remind you that you will earn $.006 for each check that you complete correctly and I will pay you in cash at the end of the study. During each session, as you work, the computer will tell you how many checks you have completed correctly and the average number of checks you have completed correctly per minute. After your last session, I will also tell you how many checks you completed correctly during each session. Once again, please leave your personal belongings and books in this room and, if you have a cell phone or pager, turn it off during the session. You may take a break whenever you like for as long as you like. You may play one of the computer games as a break, or you may also just stretch and relax. After I start the check task in the experimental room, I will leave the room and be in this room. If you need anything during the session, just come get me. Do you have any questions?
Fixed Pay Without Feedback Condition

I want to remind you that you will earn $5.75 for this session and the next 5 sessions and I will pay you in cash at the end of the study. I will also tell you how many checks you completed correctly during each session at the end of the study. Once again, please leave your personal belongings and books in this room and, if you have a cell phone or pager, turn it off during the session. You may take a break whenever you like for as long as you like. You may play one of the computer games as a break, or you may also just stretch and relax. After I start the check task in the experimental room, I will leave the room and be in this room. If you need anything during the session, just come get me. Do you have any questions?”

Fixed Pay With In-Session Feedback Condition

I want to remind you that you will earn $5.75 for this session and the next 5 sessions and I will pay you in cash at the end of the study. During each session, as you work, the computer will tell you how many checks you have completed correctly and the average number of checks you have completed correctly per minute. After your last session, I will also tell you how many checks you completed during each session. Once again, please leave your personal belongings and books in this room and, if you have a cell phone or pager, turn it off during the session. You may take a break whenever you like for as long as you like. You may play one of the computer games as a break, or you may also just stretch and relax. After I start the check task in the experimental room, I will leave the room and be in this room. If you need anything during the session, just come get me. Do you have any questions?”
Appendix H

Participant Form for Number of Checks Completed Correctly
Number of Checks Correctly Processed During Each Session: Incentive Pay System

Participant Number: ___________________

<table>
<thead>
<tr>
<th>Session Number</th>
<th>Session Date</th>
<th>Number of Checks</th>
<th>Amount Earned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TOTAL # OF CHECKS COMPLETED: ___________________

PAY FOR SESSIONS ($0.06 X TOTAL CHECKS COMPLETED)  ___________________

$5.75 FOR KEYBOARD ASSESSMENT SESSION $5.75

TOTAL PAY ___________________
Number of Checks Correctly Processed During Each Session: Fixed Pay System

Participant Number: ______________________

<table>
<thead>
<tr>
<th>Session Number</th>
<th>Session Date</th>
<th>Number of Checks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TOTAL# OF CHECKS COMPLETED: __________

PAY FOR EXP SESSIONS ($5.75 X ___ SESSIONS) _________

$5.75 FOR KEYBOARD ASSESSMENT SESSION __________ $5.75

TOTAL PAY _________
Appendix I

Debriefing Script
Debriefing Script

1. Thank you for participating in this study.

2. I would like to explain the purpose of the study to you.

   The purpose of this study was to compare the effects of individual monetary incentives and fixed pay when individuals are not given feedback about their performance with the effects of individual monetary incentives and fixed pay when individuals are given feedback about their performance.

   You were one of the participants who [did, did not] receive incentives. You were also one of the participants who [did, did not] receive feedback.

   The computer games were available because we believe that without incentives and without performance feedback individuals may spend more time performing non-work activities, which would decrease the number of checks completed. Thus, we included them as activities that you might play instead of working on the check task.

3. (Give the participant the form that indicates the number of checks he/she completed each session). This form indicates the number of checks that you processed correctly during each session. As you can see, you processed a total of ________ checks during the entire study. Because you earned [$0.06 per check, $5.75 a session, regardless of the number of checks you completed correctly], your [pay totaled] ________.

1. Do you have any questions about this study or your participation?

2. Please do not discuss this study with anyone else because we have not yet completed it.