6-2005

The Effects of Individual Monetary Incentives with Individual Feedback and Group Monetary Incentives with Group Feedback on High Performance

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THE EFFECTS OF INDIVIDUAL MONETARY INCENTIVES WITH
INDIVIDUAL FEEDBACK AND GROUP MONETARY INCENTIVES WITH
GROUP FEEDBACK ON HIGH PERFORMANCE

by

Kathryn M. Culig

A Dissertation
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the
requirements for the
Degree of Doctor of Philosophy
Department of Psychology
Alyce Dickinson, Adviser

Western Michigan University
Kalamazoo, Michigan
June 2005
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ACKNOWLEDGMENTS

This document represents the culmination of my formal education, and in some way I would like to thank everyone who has taught me, inspired me, challenged me, or supported me throughout this process.

First and foremost, a big thank you to my adviser, Dr. Alyce Dickinson, for her encouragement and unfailing support for me as a student, colleague, and friend. Many thanks also to the other members of my committee: to Dr. Bradley Huitema, for his willingness to listen and offer support and advice; to Dr. John Austin, for constantly challenging me to consider the big picture and not get lost in the details; and to Dr. Maria Malott for her enthusiasm and confidence in my abilities.

Thank you also to my classmates and other students who have helped me with invaluable discussions, and support: to Doug Johnson, for the laughter and lengthy discussions we shared in the lab during the past year, to Katie Yarling, Julie Slowiak, and Ellie Hwang for their assistance with the study, and for their input during lab meetings. Additionally, I am grateful for the help provided by Allison Mueller, Jeana Koerber, Danielle Gureghian, and Nicole Misch.

The research for this project was funded by a Chris Anderson Research Fund grant from the OBM Network and a Graduate College Research Fund grant from Western Michigan University.

Kathryn M. Culig
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Introduction

In order to retain their competitive advantage in the global market, U.S. organizations have sought out and implemented a variety of process and performance improvement strategies with the ultimate goals of increased productivity and enhanced organizational effectiveness. One such improvement effort that has regained popularity and prominence has been pay for performance. Pay for performance covers any system that seeks to link pay to some measure of individual, group or organizational level performance (Brown & Heywood, 2002). Lawler (1990) defines pay for performance as “paying individuals predetermined amounts of money for each unit produced” (p. 57). The use of pay for performance is not a new concept. In the late 1800’s and early 1900’s, Frederick Taylor used monetary incentives to improve the productivity of steelworkers (Kanigel, 1997). More than 60 percent of manufacturers responding to a 1920 National Industrial Conference Board survey reported using piece rates and 80% of all workers were employed in plants where piece rates were used (Milkovich & Stevens, 2000, p. 9). However, the prevalence of these types of programs declined dramatically from the mid 1920s through the mid 1970s due to a variety of complex factors that included the inflation and mismanagement of performance measures, the rise of the human relations movement in the 1920s, the severe economic depression in the 1930s, labor unrest, increased regulation of wages by the government, and union negotiated labor contracts (Milkovich & Stevens, 2000; Mitchell, Lewin, & Lawler, 1990; Opsahl & Dunnette, 1966; Peach & Wren, 1992). Then, in the 1980s, spurred by the reduction in the
average productivity growth rate and a decline in the global competitiveness of U.S. industries, a revitalized interest in alternative pay systems emerged (Blinder, 1990; Dickinson & Gillette, 1993; Lawler, 1990). In addition, companies began to implement group-based incentives to initiate changes in the organizational culture, consistent with the trend toward team-based work environments that occurred during those years (Honeywell-Johnson & Dickinson, 1999; McAdams & Hawk, 1992).

During the past decade, in response to the increasingly competitive global market, U.S. organizations began shifting their compensation systems from noncontingent to performance contingent pay (Latham & Huber, 1992; Lawler, 1990; O’Dell & McAdams, 1987; Wilson, 1995). The performance contingent pay systems have been adopted in order to align pay with organizational strategies designed to increase productivity (Abernathy, 1996; Belcher, 1996; Chingos, 1997; Flannery, Hofrichter, & Platten, 1996; Lawler, 1990, 1995; Risher, 1999; Schuster & Zingheim, 1992; Zingheim & Schuster, 2000). The reason for the changes was the fact that "traditional patterns of management, organization, and rewards [were] no longer working" (Wilson, 1995, p. 9); in other words, U.S. companies were losing their competitive edge.

In 2002, a survey by Hewitt Associates of 1045 U.S. organizations that included service organizations, manufacturing organizations and multi-industry organizations, found that 80% of surveyed organizations were using at least one type of variable pay plan (Hewitt Associates, 2002). This was consistent with results from the 2001 Hewitt survey when 81% of organizations offered variable pay, and up from
1995 when 59% of companies had this type of program (Hewitt Associates, 2002). Another survey by Towers Perrin indicated that of 770 North American organizations, more than two-thirds had variable pay plans (Anonymous, 2000). In another study, conducted by the Hay Group, 54% of 500 large and medium U.S. companies reported that they had begun to change their pay systems to reflect changes in organizational culture (Flannery et al., 1996). In addition, in that same study, 73% acknowledged the necessity to alter their pay systems so that they would be consistent with new cultural initiatives. Similarly, studies from 1986 to 1997 showed “large increases in the percentage of Fortune 1000 firms using a variety of compensation innovations” (Ledford & Hawk, 2000, p. 28). Thus, not only have a large number of companies altered their pay systems within the past decade, the trend appears to be continuing.

Several types of variable pay plans exist. According to the 2002 Hewitt survey, the most common types of variable pay plans reported by the 1045 surveyed organizations, were (a) business incentives, 55% (awards employees for a combination of financial operational measures for company, business unit, department, plant and/or individual performance); (b) special recognition, 52% (acknowledges outstanding individual or group achievements with small cash awards or merchandise); (c) individual performance, 47% (rewards based on specific employee performance criteria); and (d) stock ownership, 40% (rewards stock to professionals who meet specific goals). Other types of variable pay plans, not
reported in the Hewitt survey include profit sharing, gain sharing, pay-for-knowledge or skill, employee stock ownership, and merit pay.

Of the above-mentioned pay plans, only four use a predetermined formula to tie compensation to objective internal operational or economic measures: individual incentives, small group incentives, profit-sharing, and gain-sharing (Abernathy, 1990; McAdams & Hawk, 1992). Although some refer to other types of variable pay plans as pay for performance or performance contingent pay plans, in the absence of an announced formula based on objective measures, pay cannot truly be contingent on performance (Abernathy, 1990; Honeywell-Johnson & Dickinson, 1999; Mitchell et al., 1990). Only the four performance contingent pay plans will be further discussed and analyzed.

Profit-sharing and gain-sharing link compensation to the performance of a department, division or organization, and not to individual performance (Abernathy, 1990; Caruth & Handlogten, 2001; Honeywell-Johnson & Dickinson, 1999; Lawler, 1990). Gain-sharing plans, also called cost savings plans, are based on the principle that cost-reduction is a cooperative effort and any resulting savings should be shared between the organization and the employees. Gain-sharing bonuses are typically distributed monthly, quarterly, annually, or are placed in a retirement savings plan (Caruth & Handlogten, 2001). Profit-sharing plans are utilized in the hope that employees will become more conscious of using their time effectively and will also become more conscious of costs in general. Profit-sharing bonuses are usually calculated annually and distributed on an annual basis or placed in retirement plans.
(Caruth & Handlogten, 2001). From a motivational perspective, the extra pay resulting from gain-sharing or profit-sharing plans is too delayed from an individual’s day-to-day performance to have much, if any, affect on it. Furthermore, given the size of the group included in the plan, there is little relation between an individual’s day-to-day performance and the amount of the bonus. It is difficult, if not impossible, for an individual to determine how his/her daily performance contributed to the critical measure, and even more so to the amount of the bonus. In contrast, individual and small group incentive systems tie the worker’s pay to the worker’s performance (Abernathy, 1990; Honeywell-Johnson & Dickinson, 1999; Lawler, 1990).

Individual incentives are based only on the performance of the employee; they are not affected by the performance of others. The defining feature of individual incentive systems is as follows: employees receive “a predetermined amount of money for every unit of work they produce” (Wilson, 1995, p. 115). In addition, individual incentives have three additional characteristics that are common to other effective rewards and consequences as well: (a) they are based on clearly specified behaviors or outputs, (b) they are certain (if the behavior or output occurs, employees will receive the extra compensation), and (c) they are distributed as soon after the performance as possible, usually in the employee’s regular paycheck (Bucklin & Dickinson, 2001). Compensation experts (Conrad, 1994; Lawler, 1990, 1992; McCoy, 1992; McNally, 1988) and behavioral psychologists (Braksick, 2000; Brown, 1982; Daniels & Daniels, 2004; O’Brien & Dickinson, 1982) alike have emphasized
the importance of these characteristics when the goal of an intervention program is to influence work performance.

Group incentives are based on both the performance of the employee and the performance of others in the employee’s designated group. Lawler (1995) defines group performance incentive plans as plans that “reward workers for their group and team performance” (p. 17). He also states that the “primary objectives behind linking pay to group performance include motivating group members to focus on group goals and to perform effectively” (p. 18). In contrast to individual incentives, group incentives are affected by the performance of others in the group. However, they also have several features in common with individual incentives in that they are (a) based on clearly specified behaviors or outputs, (b) certain, and (c) distributed in the employee’s regular paycheck (Bucklin & Dickinson, 2001). With respect to the effectiveness of group incentives, the size of the group is considered to be an important factor (Blinder, 1990; Honeywell-Johnson & Dickinson, 1999; Honeywell, Dickinson, & Poling, 1997; Lawler, 1990). As the group size increases, the capacity of an individual employee to control his or her wages decreases, thus weakening the link between their performance and pay.

During the past decade, organizations have increasingly implemented work groups and work teams in order to increase productivity and to enhance organizational effectiveness (Dulebohn & Martocchio, 1998). Concurrently, there has been a trend among employers to adopt performance incentives that reward workers for the work group and team performance. Surveys conducted over the same period
consistently reported that 12%-16% of U.S. companies used small group incentives (Honeywell et al., 1997). And, in 1992, Peterson identified six manufacturing industries in which at least 50% of employees were covered by group plans. Although individual incentives are more prevalent, the use of group incentives is increasing (Honeywell-Johnson & Dickinson, 1999). In a 1994 Hay Group survey, 39% of respondents who did not use group incentives indicated that they were considering them (Gross, 1995). Similarly, Ledford and Hawk (2000) reported that Fortune 1000 firms increased their use of group incentives by 50% between 1987 and 1996. With respect to evaluations of effectiveness, in one survey, 75% of the 185 companies who used small group incentives reported positive effects (O’Dell & McAdams, 1987). In another survey, 81% reported favorable reactions by employees, and 67% reported bottom-line improvements (McCoy, 1992). In spite of the growth in the use of group incentive plans, longitudinal research of the Fortune 1000 organizations by Lawler, Mohrman, and Ledford (1995) found that many firms are uncertain about the effectiveness of their group incentive plans (Dulebohn & Martocchio, 1998). Contributing to this uncertainty is a lack of controlled research that has examined performance rewards, such as work group incentives, being adopted by companies (Dulebohn & Martocchio, 1998).

**Individual Incentives and Group Incentives**

In the absence of incentive plans, the link between an employee's performance and his/her compensation is often tenuous at best and nonexistent at worst. Employees may simply put in their time and receive their pay. Under
conventional compensation systems (i.e., hourly pay or salary pay), significant differences in employee performance may not be recognized, or if they are recognized, may not be rewarded proportionally. Because incentives relate performance directly to pay, differences in employee performance can be identified precisely and rewarded accordingly (Caruth & Handlogten, 2001). Moreover, the stronger the link between performance and pay, the higher the performance. Individual incentives provide the strongest link between performance and pay, because incentives are based solely on the performance of the individual. With group incentives, because a worker’s pay depends on the group’s performance, his/her control over earnings decreases as the group size increases. Even though large group incentives may not effectively influence a worker’s performance, small group incentives may (Honeywell et al., 1997). In small groups, workers can substantially influence the group’s performance, thereby increasing or decreasing their own earnings. Therefore, they may perform as well when they receive small group incentives as when they receive individual incentives (Honeywell-Johnson & Dickinson, 1999; Honeywell et al., 1997).

**Individual Incentives**

Laboratory and field studies have consistently demonstrated that individual incentives increase performance in comparison to hourly pay (e.g., Allison, Silverstein, & Galante, 1992; Bucklin, McGee, & Dickinson, 2003; Dickinson & Gillette, 1993; Frisch & Dickinson, 1990; LaMere, Dickinson, Henry, Henry, & Poling, 1996; London & Oldham, 1977; Riedel, Nebecher, & Cooper, 1988; Smoot &
Given that the general effectiveness of individual incentives had been established, much of the subsequent research focused on comparing the relative effectiveness of various types of arrangements of individual incentives. Three thematic lines of research emerged: Investigations of (a) schedules of incentive delivery; (b) linear, accelerating, and decelerating piece-rate pay; and (c) percentages of total or base pay earned in incentive pay (Bucklin & Dickinson, 2001).

In studies that have examined different arrangements between performance and individual incentives, performance levels have not been functionally related to (a) the ratio schedule of delivery, (b) linear, accelerating or decelerating piece-rate pay, or (c) the percentage of total pay and base pay earned in incentive pay. Although not conclusive, the data from these three lines of research suggest that the main determinant of productivity is the contingent relationship between performance and incentives rather than the specific way the incentives are related to performance (Bucklin & Dickinson, 2001).

**Individual Incentives with Individual Feedback**

In most of the studies investigating the effects of individual incentives, performance feedback was a planned component of the incentive system or readily available due to the nature of the task (Bucklin & Dickinson, 2001). This feedback typically consisted of specific, daily information about individual performance and how that performance related to the incentive earned. Such feedback may sustain performance under different incentive arrangements. In other words, feedback may
eliminate any performance differences that would result from different incentive pay arrangements if it were not present. Whether feedback enhances the effects of monetary incentives is important from a business perspective. Buyniski (1995) reported that many organizations do not provide feedback to employees when they pay them incentives. Thus, if feedback does enhance performance and the effectiveness of the incentives, organizations could improve employee productivity by implementing a relatively inexpensive feedback system along with incentive pay (Bucklin & Dickinson, 2001).

Three studies have examined the effects of monetary incentives with and without feedback on performance, however, two contained methodological confounds that made interpretation problematic (Agnew, Dickinson, Acker, Cronin, & Goldwater, 1992; Smoot & Duncan, 1997). Only one study examined the effects of individual monetary incentives with and without feedback on performance, while controlling two variables that were identified as potential confounds in laboratory studies, the lack of attractive alternative activities and social demands (Bucklin et al., 2003). These potential confounds relate to differences between actual work settings and laboratory simulations. Work settings offer a vast array of attractive off-task activities that compete, often effectively, with work tasks and the effects of incentives. Although off-task activities were available to participants in all of the laboratory studies, they may not have been as attractive as those in a work setting. Without attractive alternatives, participants may spend all of their time engaging in the experimental task regardless of the specific arrangement between the incentives.
and performance (Bucklin & Dickinson, 2001). In addition, in actual work settings, performers have the opportunity to engage in off-task activities when the supervisor is not present. However, in the laboratory studies the experimenter was always present and this may have restricted the extent to which the participants engaged in off-task activities.

Agnew et al. (1992) used a within-subject ABA design to assess performance under (A) monetary incentives only and (B) monetary incentives with performance feedback. Four participants were hired through a help-wanted advertisement to perform a computerized data entry task for seven hours a day for four to five weeks. The monetary incentive system included a guaranteed hourly wage and $0.57 per correct entry past proficiency level. During feedback phases, the computer displayed the number of items entered correctly after the second and seventh hour and, at the end of the session, the researcher graphed the total number of items completed correctly. The introduction of feedback resulted in inconsistent effects, with only slight performance improvements for two of the four participants. However, two methodological flaws, (a) the criterion might have been too high for participants to earn the incentives, and (b) the sessions were too long and boring as reported by the participants, make it necessary to interpret these results cautiously.

Smoot and Duncan (1997) compared the effects of three incentive pay systems (linear piece-rate pay, accelerating piece-rate pay, decelerating piece-rate pay) and base pay only, with and without performance feedback. Within-subject and between-group comparisons were made to the data from 30 college students who had

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been randomly assigned to six groups. In the baseline condition, all participants were
given base pay. Following baseline, two groups were exposed to linear piece-rate pay
with feedback, two groups were exposed to accelerating piece-rate pay with feedback,
and two groups were exposed to decelerating piece-rate pay with feedback. As the
final phase for one of the two groups exposed to each of the incentive systems (i.e.,
three of the six groups), feedback was removed to examine its supplemental effects.
Performance improved when the feedback was removed, indicating that the feedback
did not provide any supplemental control. In fact, in this study, feedback had a
negative effect on performance. However, two methodological flaws, (a) the feedback
activity required the participant to stop engaging in the experimental task to tally the
parts completed, thus less session time was available for him/her to perform the task,
and (b) the effects of feedback in the previous condition may have carried over to the
incentive without feedback condition, make it necessary to interpret these results
cautiously.

Bucklin et al. (2003) used a within-subject ABAC design to examine
performance under (A) monetary incentives without end-of-session feedback, (B)
monetary incentives with end-of-session performance feedback, and (C) hourly pay
with end-of-session feedback. Participants were seven undergraduate students who
performed a computer simulated work task, SYNWORK (Elsmore, 1994), for three
90-min sessions over 12 – 15 weeks. During the monetary incentive conditions,
participants received a piece-rate pay of $.10 for every 100 points earned on
SYNWORK. If participants accumulated 7,500 points per session, they received
$7.50, which was the same amount they received in the hourly pay condition. During feedback phases, the computer displayed the number of points earned by participants at the end of each session. No feedback was provided during the session. To control for the potential confound of the lack alternative activities, during all sessions, participants had access to alternative computer activities on adjacent computers (e-mail, the Internet, and three computer games). In addition, to control for the potential confound of social demands, the experimenter was not present during any of the experimental sessions. Performance improved for six of seven participants when feedback was added to the monetary incentive condition. Furthermore, for all but one participant, performance did not change until feedback was provided, lending credibility to the interpretation that feedback enhanced the effectiveness of incentives. Additionally, all participants displayed higher performance when feedback was combined with incentives than when feedback was combined with hourly pay, suggesting that monetary incentives do enhance the effects of feedback. Moreover, for six of the seven participants, performance was considerably higher during the incentive without feedback condition than during the hourly pay plus feedback condition. However, performance did not reverse for six of the seven participants after the feedback was removed, thus the results must be viewed cautiously.

**Group Incentives**

The effects of group monetary incentives have not been as extensively researched as the effects of individual incentives. In a recent review of the literature, Honeywell-Johnson and Dickinson (1999) stated that, "relatively few experimental
investigations have examined the effects of group monetary incentives on the performance of groups that are of the size typically found in the workplace" (p. 116). Their search of the literature, which excluded survey studies, uncovered only 12 experimental studies, four of which were unpublished. Two additional experimental studies (Honeywell-Johnson, McGee, Culig, & Dickinson, 2002; Thurkow, Bailey, & Stamper, 2000) have been published since Honeywell-Johnson and Dickinson (1999) published their review, bringing the total of known studies to 14. Most of these studies examined groups having less than 10 members. Only three field studies examined groups having more than 12 members. Noting the small number of studies, Dickinson (2000) emphasized the need to conduct additional research, particularly in light of the fact that group incentive systems are being increasingly adopted by organizations.

Four of the 14 studies examined the effects of group size on performance (Campbell, 1952; Marriott, 1949; Roberts & Leary, 1990; Stoneman & Dickinson, 1989), 5 examined the effects of group incentives and hourly pay on performance (Allison et al., 1992; Farr, 1976; Honeywell-Johnson et al., 2002; Miroff, Naylor, Lubeach, Greenberg, Gillen, Sitarsky, & Duncan, 1993; Smoot, 1997), 7 compared group and individual incentives (Allison et al., 1992; Farr, 1976; Honeywell et al., 1997; Roberts & Leary, 1990; Smoot, 1997; Stoneman & Dickinson, 1989; Thurkow et al., 2000), and 3 compared cooperative (equally divided) and competitive (differentially divided) group incentives (Allison et al., 1992; Farr, 1976; Weinstein & Holzbach, 1973). Only two studies investigated the effects of group incentives on
high performance (Honeywell-Johnson et al., 2002; London & Oldham, 1977). Five studies also examined participants’ satisfaction and/or preference of the pay systems (Allison et al., 1992; Farr, 1976; Honeywell et al., 1997; Honeywell-Johnson et al., 2002; Thurkow et al., 2000):

**Group size.** Group incentives are based both the performance of the employee and the performance of others in the employee’s designated group. In small groups, workers can substantially influence the group’s performance. However, “as the group size increases, the capacity of an individual worker to control his or her wages under group incentives conditions decreases” (Honeywell et al., 1997, p. 262). Blinder (1990) referred to this as the “1/nth problem,” in which “n” represents the number of employees in the group. As “n” increases, the worker loses control over his or her wages and hence the effectiveness of group incentives is likely to decrease (Blinder, 1990; Honeywell-Johnson & Dickinson, 1999; Honeywell et al., 1997). An individual employee retains a certain degree of control over the group’s performance, and his or her wages when the size of the group is relatively small. Thus, group incentives may effectively influence performance when the work group is small.

The effects of group size on performance were investigated in four of the fourteen studies. Only two early field studies (Campbell, 1952; Marriott, 1949) examined the effects of group incentives on the performance of large groups. In the first study (Campbell, 1952) study, group size ranged from under 20 to over 100 workers. In the second (Marriott, 1949), groups ranged in size from under 10 to over 50. Workers received incentives based on the group’s total productivity, that is, they
all received the same amount of incentive. In both studies, performance decreased as the size of the group increased.

The results of investigations with small groups have differed from the results reported by Campbell (1952) and Marriott (1949). Stoneman and Dickinson (1989) and Roberts and Leary (1990) examined the effects of equally divided group incentives on the performance of groups ranging in size from two to nine members. The two studies were conducted in laboratory settings and between group comparisons were utilized. In both studies, the performance of the groups was comparable regardless of the size of the group.

The most likely reason for the differences in results between the two field studies and the two laboratory studies is the size of the groups that were examined. However, Honeywell-Johnson and Dickinson (1999) posited three additional factors that may have contributed to the differences: (a) the length of exposure to the pay systems; (b) the amount of the incentives; and (c) differing types of social interactions. Nonetheless, the results of the four studies suggest that group incentives are likely to be (a) less effective with large groups than with small groups, and (b) equally effective with groups having ten and fewer members.

Group incentives versus hourly pay. Five of the 14 studies compared the effects of small group monetary incentives and hourly pay. Four of the studies were conducted in a laboratory setting (Farr, 1976; Honeywell-Johnson et al., 2002; Miroff et al., 1993; Smoot, 1997) and one was conducted in a field setting (Allison et al., 1992). The results from these studies have been consistent. For groups ranging in size
from 3 to 12 members, group monetary incentives have resulted in higher levels of performance than hourly pay. Furthermore, performance was higher when participants were paid group monetary incentives than when they were paid hourly, regardless of whether the incentives were equally divided among group members (Farr, 1976; Honeywell-Johnson et al., 2002; Miroff et al., 1993; Smoot, 1997) or differentially divided (Farr, 1976).

Group incentives versus individual incentives. Seven studies compared the effects of equally divided group incentives and individual incentives on performance (Allison et al., 1992; Farr, 1976; Honeywell et al., 1997; Roberts & Leary, 1990; Smoot, 1997; Stoneman & Dickinson, 1989; Thurkow et al., 2000). Five of the studies were conducted in a laboratory setting and two in field settings. The size of the groups ranged from two to twelve members, with the exception of the Thurkow et al. (2000) study. In that study, group size varied from session to session with an average of seven members, but the groups ranged from two to twenty-four members. In all of the studies, performers received per piece incentives based on their own performance during the individual incentive condition, and equally divided incentives based on the pooled performance of the group during the group incentive condition. However, in one study (Thurkow et al., 2000), the top performer also received an additional bonus during the group incentive condition.

In five of the seven studies (Farr, 1976; Honeywell et al., 1997; Roberts & Leary, 1990; Smoot, 1997; Stoneman & Dickinson, 1989), performance was comparable when workers received equally divided group incentives and individual
Incentives. In one of the two field studies (Allison et al., 1992), performance was slightly higher when workers received equally divided group incentives. Thus, in six of the seven studies, the small group incentives were at least as effective as individual incentives.

In contrast, results from the Thurkow et al. (2000) study differ notably. In that study, telephone interviewers performed substantially better when they received individual incentives than when they received equally divided group incentives. The reason for this disparity is not clear, but one reason could have been the lack of a clear performance standard during the group incentive condition, when incentives were dependent upon the group's performance exceeding this standard. In addition, it was difficult for supervisors to give interviewers accurate goals, based on final person-hours, during the shift because of methodological problems, e.g., interviewers failed to report for scheduled shifts, or were tardy. Other possible reasons for the divergent results are related to group size and composition. Although the results were based on the performance of six participants, the participants were part of different sized groups from day to day, depending upon how many other employees were scheduled to work. Additionally, the average size of the work group was seven members, but it varied from two to twenty-four members. Thus, the size of the group, its uncertainty, and/or the changeable group composition from session to session could explain the superiority of individual incentives in this study. One additional reason for the differing results that was suggested by the authors, was that the six participants typically performed higher than other members of their groups (Thurkow
et al., 2000). Thus, the authors suggested, based on analyses by Dierks and McNally (1987) and Dickinson and Honeywell-Johnson (1999), that the participants may have decreased their performance during the group incentive condition because they received less money in incentives. Based on these methodological flaws, the results of this study should be interpreted cautiously.

In summary, in six of the seven studies, equally divided small group incentives were found to be at least as effective as individual incentives for groups ranging in size from two to twelve members. While Thurkow et al. (2000) reported that group incentives were not as effective as individual incentives, this finding appears to be an anomaly. As indicated above, there are several reasons why Thurkow et al.'s findings may have differed from the findings of the other studies, including (a) the lack of a clear group goal during the group incentive condition, (b) the size of the payout group, (c) the changing membership of the group, and (d) the possibility that the participants were high performers in comparison to the other workers.

Three of the seven studies that examined equally divided group incentives, also compared differentially divided (competitive) group incentives with individual incentives (Allison et al., 1992; Farr, 1976; Thurkow et al., 2000). When incentives are differentially distributed, the amount of incentives that a worker receives is more dependent on his or her performance. The differentially divided rewards in these three studies were competitive, that is, when one group member received incentives, it
decreased the opportunity for other members in the group to receive the same or a similar amount of incentives.

In one study (Farr, 1976), one group of participants received per piece incentives for correctly sorting computer cards that were punched with different patterns of holes. In the differentially divided group incentive condition, the top performer in a three-person group received 50% of the available incentives, the middle performer received 33%, and the low performer received 17%. Differentially divided incentives resulted in higher performance than individual incentives and, higher performance than equally divided group incentives.

In the Allison et al. (1992) study, workers received incentives based on the percentage of target behaviors completed during the week. In the individual incentive condition, incentive pay was calculated by multiplying the percentage of target behaviors completed by $20.00. In the differentially divided group incentive condition, pay was calculated by dividing the total amount of incentives available ($200.00) equally among the top three of twelve performers. No significant differences in performance were observed between differentially divided group incentives and individual incentives.

In the Thurkow et al. (2000) study, telephone interviewers received hourly pay and a per survey incentive for each survey completed above a specified goal during the individual incentive condition. During the competitive incentive condition, only the top performer received a bonus. The bonus was provided weekly and
consisted of an extra hour of pay. Performance was substantially higher when workers were paid individual incentives.

The results of the three studies comparing differentially divided (competitive) group incentives with individual incentives are inconclusive. In the first study (Farr, 1976) performance was higher when participants received differentially divided incentives than when they received individual incentives, in the second study (Allison et al., 1992) performance was comparable, and in the third study (Thurkow et al., 2000) performance was lower when participants received competitive incentives. It should be noted that the competitive incentive systems in the above studies differed considerably from each other and likely contributed to the differing results. Before definitive conclusions can be made about the relative effectiveness of differentially divided group incentives versus individual incentives further research is required. However, because competitive rewards may have long-term detrimental effects as workers vie for the limited rewards, a number of individuals have argued against their use in work settings (Daniels, 1994; Honeywell-Johnson & Dickinson, 1999).

The effects of group incentives on high performance. Two published studies have investigated the effects of group monetary incentives on high and low performance (Honeywell-Johnson et al., 2002; London & Oldham, 1977). This topic of research is important for several reasons. As discussed earlier, in six of seven studies, equally divided group incentives were just as effective as individual incentives with groups ranging in size from two to twelve members (Allison et al., 1992; Farr, 1976; Honeywell et al., 1997; Roberts & Leary, 1990; Smoot, 1997;
Stoneman & Dickinson, 1989). Honeywell-Johnson and Dickinson (1999) stated that these results may have been due to the fact that individuals within the group performed similarly to one another. If participants within a group perform similarly, the amount of pay they receive under individual and group incentives does not vary much (Dickinson, 2000). If pay does not vary, then one would not expect performance to vary either, because the monetary contingencies are essentially the same for the performer. Thus, when members within a group perform similarly to each other, individual and group incentives are likely to result in comparable performance levels.

However, if group members do perform differently from each other, i.e., some are high and some low performers, group incentives are likely to decrease the performance of high performers. In 1987, Dierks and McNally argued against group incentive systems on the basis that high performers would decrease their performance when they saw their earnings repeatedly decreased by other workers. Dickinson (2000) concurred, stating that, “decreases in group productivity are most likely to result when high performers earn less money when paid group incentives and lower their performance accordingly over time” (p. 5). Poor performers, on the other hand, would be expected to continue their poor performance when paid group incentives because their earnings would increase noncontingently (Honeywell et al., 1997). If, indeed, high performers decreased their performance and low performers did not alter theirs, group productivity would clearly suffer.
Four of the seven studies that compared the effects of equally divided and individual incentives reported individual performance data (Honeywell et al., 1997; Smoot, 1997; Stoneman & Dickinson, 1989; Thurkow et al., 2000). Individual data are necessary to determine whether members of the group performed similarly to one another or differently from one another. The four that provided individual data will be discussed next, to explore Dickinson’s (2000) contention that if performers within a group perform similarly, performance is likely to be the same under individual and group incentives.

Stoneman and Dickinson (1989) examined eight groups ranging in size from two to nine members. Participants performed comparably when paid group and individual incentives. In four of the eight groups a clear high performer emerged, based on visual inspection of the individual data. In three of the four groups, the performance of the high performer was comparable under individual and group incentives. In the remaining group, the high performer performed better during the individual incentive phases. The results from three of the four groups that contained a clear high performer do not appear to support Dickinson’s (2000) contention that high performers will decrease their performance over time when paid group incentives. However, participants were paid only once at the end of the group incentive phase and thus their performance may not have come under the control of decreased wages. Additionally, the groups were small (two to five members), and therefore the top performers still had considerable influence over their own wages.
Smoot (1997) examined individual and group incentives with six three-member groups, and, similar to Stoneman and Dickinson (1989), found performance to be comparable when individuals received individual and group monetary incentives. Because most of the subjects performed comparably to each other within the groups, the overall results of this study lend support to Dickinson’s (2000) contention that if group members perform similarly to each other, their performance is likely to be the same when they are paid individual and group incentives.

Honeywell et al. (1997) examined two 10-person groups. As with the prior two studies, individuals performed similarly when they were paid individual and group monetary incentives. However, a more detailed analysis of Honeywell’s data supports the possibility that high performers decreased their performance (Honeywell-Johnson et al., 2002). When Honeywell et al. (1997) statistically analyzed their data, they collapsed the data across the two groups of participants. When the data for the two groups were analyzed separately, however, performance was statistically significantly lower during the group incentive conditions for one of the groups. This group contained the highest performers with the highest pay differentials between the individual and group incentive conditions. These results prompted Honeywell-Johnson et al. (2002) to state that they warranted further study.

In Thurkow et al.’s (2000) study, individuals performed higher when they were paid individual incentives than when they received group monetary incentives. As noted by the authors, an analysis of the individual performance data revealed that their six participants performed better than the other group members in 67% of the
sessions. Thus, the participants could be considered high performers and, as stated by Thurkow et al., “based on Dickinson and Honeywell-Johnson (1999), would be expected to perform lower during the group incentive sessions” (p. 19).

The data from the preceding studies support the conclusions that (a) when group members perform similarly to each other, equally divided and individual incentives will result in similar levels of performance (Honeywell-Johnson et al., 2002; Smoot, 1997; Stoneman & Dickinson, 1989), and (b) when a group contains high performers, group incentives may decrease their performance and thus, the overall productivity of the group (Honeywell-Johnson et al., 2002; Thurkow et al., 2000).

As stated previously, only two experimental studies have examined the effects of group monetary incentives on high and low performance (Honeywell-Johnson et al., 2002; London & Oldham, 1977). London and Oldham (1977) investigated the performance of 35 two-person groups. The two group members worked in separate rooms where they sorted cards based on the pattern of holes in the card. Participants were first exposed to an individual monetary incentive condition in which they received $0.01 for each card they sorted during a 5-minute session. After this first session, participants were paid, and one-half of the group was told that they were high performers, i.e., they were told that they sorted 25% more cards than their partner, while the other half was told that they were low performers, i.e., they were told that they sorted 25% fewer cards than their partner. Thus, in each pair, one person believed that he or she was a high performer while the other believed that he or she
was a low performer. Participants were then randomly assigned to one of five pay conditions for three 5-minute sessions: fixed rate pay, the individual incentive condition or one of three equally divided group monetary incentive systems. Even though the three group monetary incentive conditions were all equally divided, in one of the group conditions, the incentive was based on the performance of the high performer, in the second, the incentive was based on the performance of the low performer, and in the third, the incentive was based on the average performance of the both performers. The former two conditions are unique to this study. That is, when other studies have examined equally divided incentives, the group incentives have been based on either the average performance of the group members or the pooled performance of all group members (which equates to the average performance of the group members). Thus, only the results for participants who were exposed to the equally divided rewards based on their average performance will be discussed herein. Readers who are interested in a detailed analysis of all the results are referred to the original study.

Participants who were told that they were low performers sorted about the same number of cards when they were paid equally divided group incentives and when they were paid individual monetary incentives (average = 56.5 cards versus 58.5 cards). However, participants who were told that they were high performers sorted 16% fewer cards when they were paid equally divided group incentives than when they were paid individual incentives (average = 58.2 cards versus 69.6). Statistical analyses were not conducted for the within-subject comparisons, nor were

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the results of between-group analyses reported for individual incentives and equally
divided group incentives, thus these results cannot be considered conclusive and
should be interpreted cautiously (Honeywell-Johnson et al., 2002). Nonetheless, these
data suggest that the performance of high performers will be better when they are
paid individual incentives than when they are paid equally divided group incentives.

Honeywell-Johnson et al. (2002) used a within-subject ABCB design to
examine the effects of individual and group incentives on the performance of high
performers, under (A) hourly pay with individual feedback, (B) individual incentives
with individual feedback, and (C) group incentives with group feedback. Participants
were four college students who performed a computerized simulated work task,
SYNWORK (Elsmore, 1994), on networked computers. Each session was two hours
and each phase lasted between 5-10 sessions. Participants could engage in alternative
activities (email and computer games) on adjacent computers whenever they wanted.
In addition, participants were prompted to take three 5-minute work breaks during the
session.

During the hourly pay condition, participants earned $10.00 per session.
During the individual and group incentive conditions, the amount of money they
received was based on the number of points they earned each session. In the
individual incentive condition, participants received $.10 for every 100 points earned.
At the end of each session, the computer displayed the number of points earned. In
the group incentive condition, participants were told that they were members of a ten-
person group and that their incentives would be based on the average performance of
the group members. Participants received $.10 for every 100 points in the group average. The groups, however, were simulated. During the group incentive phase, the group average was calculated so that it was always lower than the point score of the participant; that is, so the participant would always be a “high performer.” Because of that, participants earned less money during the group incentive phase than during the individual incentive phases. During the group incentive condition, the computer displayed the average group score at the end of each session. The individual’s point score was not displayed during this condition. In a post-experimental questionnaire, all four participants indicated that they believed there were, in fact, nine other members in their group.

The performance of all four participants was appreciably higher during the individual incentive conditions than during the hourly pay condition. Three of the four participants performed lower during the group incentive condition than during the individual monetary incentive condition. The performance of the fourth participant increased throughout the study, regardless of pay condition. Honeywell-Johnson et al. (2002) concluded that the group incentives resulted in lower performance than the individual incentives, stating, “these data indicate that high performers are likely to decrease their performance when they are paid small group monetary incentives” (p. 100).

While the results of the studies conducted by London and Oldham (1977) and Honeywell-Johnson et al. (2002) are suggestive, they are not definitive. As indicated earlier, the results reported by London and Oldham are problematic due to the lack of
clarity with respect to the statistical comparisons. In addition, they examined groups with only two members while in business and industry, group incentives are most commonly implemented with groups of ten members (Honeywell et al., 1997). Finally, participants were exposed to the pay conditions for only three 5-minute sessions. Performance over longer time periods may differ. With respect to the Honeywell-Johnson et al. (2002) study, only four participants served as subjects, and the performance of one did not decrease during the group incentive phase.

McGee (2004), in an unpublished dissertation, and subsequently, McGee, Dickinson, Huitema, and Culig (2005), in a follow-up report that included statistical analyses of the data, extended the work of London and Oldham (1977) and Honeywell-Johnson et al. (2002). McGee (2004) used a within-subject ABCDC design to examine the performance of high performers working in 10-person simulated groups under (A) hourly pay with individual feedback, (B) individual incentive pay with individual feedback, (C) individual incentive pay with individual and group feedback, and (D) group incentive pay with individual and group feedback. By holding the comparative group feedback constant across the individual and group incentive conditions (the CDC phases), any performance differences that occurred could be attributed to the pay system itself, rather than to the comparative feedback indicating that the participant was a high performer. The inclusion of comparative group feedback in the McGee (2004) study eliminated a confound in previous studies (Honeywell et al., 2002; London & Oldham, 1977) in which participants were first exposed to individual incentive pay without comparative group feedback, then
exposed to group incentive pay with comparative group feedback. Thus, the comparative group feedback, the group incentive pay, or a combination of both may have contributed to the observed differences in performance under the individual incentive pay condition and the group incentive pay condition.

In the McGee (2004) study, participants were 11 college students who performed a computerized data entry task that was modeled after the job of a bank proof operator. Each session was 45 minutes and each phase lasted between 5-10 sessions. Alternative tasks (computer games) were available on the computers and participants could engage in those activities whenever they wanted.

Statistical analyses from the McGee et al. (2005) study revealed that high performers performed better under both individual incentive pay (phases BC) and group incentive pay (D) than under hourly pay (A) (p < 0.01). High performers performed lower when paid group incentives (D) than when paid individual incentives after exposure to both pay systems (phases CD) although the decrease in performance was not significant (p > 0.05). However, high performers increased their performance significantly when switched from the group incentive phase (D) to the final individual incentive phase (C) (p < 0.01). Moreover, the increase was considerably greater than the decrease that occurred when the conditions changed from individual incentive pay to group incentive pay (71 check increase vs. 43 check decrease). Thus, a history of exposure to both types of pay systems may be necessary for such performance differences to emerge.

The lower performance during the group incentive with individual and group
feedback phase (D) appeared to be due to decreases in the amount of money earned rather than to the comparative feedback they received that indicated they were high performers for the following reasons. First, when participants were paid individual incentives they did not decrease their performance when switched from individual feedback to comparative feedback (phases BC) (p > 0.05). In other words, the addition of group feedback did not result in significant changes in performance. Secondly, participants received comparative feedback when they received both individual and group incentives during the final phases (CDC). Thus, any changes in performance were likely due to changes in earnings rather than to the comparative feedback.

*Satisfaction and preference of high performers.* Productivity is not the only concern when analyzing the effects of incentive systems; employee acceptance is critical to the success of a pay system as well (Honeywell-Johnson & Dickinson, 1999). Moreover, Mawhinney (1984) has argued that organizational interveners have an ethical responsibility to evaluate employee satisfaction: “We propose to jointly improve productivity and quality of work life (job satisfaction). But we rarely measure satisfaction” (p. 27). “Unless the contingencies designed to improve productivity are patently positive (joy producing), some technology for estimating the condition it produces in people must be employed” (Mawhinney, 1984, p. 7).

Three studies (Honeywell et al., 1997; Honeywell-Johnson et al., 2002; McGee, 2004) that examined high performers also reported participants’ satisfaction with and/or preference for the individual incentive and group incentive systems. In
Honeywell et al.'s (1997) study, while high performers rated the two types of incentives similarly, all preferred individual incentives when asked to choose between them. All four of Honeywell-Johnson et al.'s (2002) high performers indicated that they preferred the individual incentives and found them to be more satisfying than either hourly pay or group incentives. Three of the four reported that the group incentive system was the most stressful. These results suggest that top performers prefer individual incentives and find group incentives to be more stressful than either hourly pay or individual incentives. Satisfaction and preference results from McGee's (2004) unpublished dissertation are also similar to those reported by Honeywell et al. (1997) and Honeywell-Johnson et al. (2002). McGee (2004) reported that the majority of participants found the individual incentive system to the most preferred (9 of 11 participants) and the most satisfying (8 of 11 participants), and the group incentive system to be the least preferred (11 of 11 participants) and the least satisfying (8 of 11 participants) of the three pay systems (hourly pay, individual incentive pay, and group incentive pay).

It is important to note that participant's satisfaction ratings are likely influenced by the amount of money earned. Dickinson and Gillette (1993) reported that four of six participants in their study preferred the base pay plus incentive pay system to the piece rate pay system because they earned more money in this condition. In other words, the preferences appear to be related to the amount of money earned rather than to the type of incentive system. Similarly, in a study designed to identify factors that influence employee reactions to pay for performance
plans, Miceli, Jung, Near and Greenberger (1991) reported a relationship between the magnitude of performance-based rewards and satisfaction with the type of pay system.

High performers will always earn more when they are paid individual incentives than when they are paid group incentives. Thus, it is not surprising that high performers report that they prefer individual incentives, given that they can earn more money under this system than under either hourly pay or group incentive pay (Honeywell et al., 1997; Honeywell-Johnson et al., 2002; McGee, 2004). Nonetheless, for high performers the amount of pay and the type of incentive system will always be confounded in actual work settings. Thus, it is likely that high performers in actual organizations will prefer individual incentives, however, their preferences may be related to their higher earnings, rather than to the features of the incentive system.

The Current Study

The current study extended the work of McGee (2004). It examined how group and individual incentives affected high performance across multiple sessions using 10-person simulated groups. The primary objectives of the study were to examine the effects of individual and group monetary incentives on (a) the high performance of individuals and (b) the satisfaction of high performers. The current study also extended the work of McGee et al. (2005) by examining whether high performers would (a) decrease their performance when switched from individual incentives to group incentives initially (phases BC), and (b) increase their
performance when reversed from group incentives to individual incentives (phases CB), using feedback procedures that are more typical of those used in business. That is, only individual feedback with individual incentives and group feedback with group incentives. A within-subject reversal design was used. The experimental task was a computerized data entry task that was modeled after the job of a bank proof operator.

The main difference between the current study and the study conducted by McGee (2004) related to the feedback procedure utilized during the individual incentive and group incentive phases. McGee (2004) provided both individual and group feedback, i.e., social comparison feedback, during the individual incentive and group incentive phases. In the current study, participants only received individual feedback with individual incentives and group feedback with group incentives. In McGee’s (2004) study, comparative feedback was provided as a control to insure that decreases that were observed could be attributed to decreased earnings and not to the participant’s awareness that he/she was a high performer.

Social comparison feedback (SCF) displays specific information about an individual’s or group’s performance in comparison to a relevant comparison group (Williams & Geller, 2000). The effects of SCF have not been widely examined (Alvero, Bucklin, & Austin, 2001; Siero, Bakker, Dekker, & vandenBurg, 1996; Williams & Geller, 2000). In their 13-year review of feedback literature, Alvero et al. located only 4 published studies that examined social comparison feedback (Brown & Sulzer-Azaroff, 1994; Goltz, Citera, Jensen, Favero, & Komaki, 1989; Houmanfar & Hayes, 1998; Johnson & Masotti, 1990). Moreover, the results from these studies
were inconclusive. Additionally, Williams & Geller (2000) reported that there is contradictory evidence regarding the influence of SCF on task performance, and no published data on the influence of SCF on industrial safety performance. No published research of SCF in the monetary incentive literature was found.

In three studies (Goltz et al., 1989; Siero et al., 1996; Williams & Geller, 2000) when group feedback was added to individual feedback (or vice versa) performance increased substantially. Williams and Geller (2000) reported that group SCF improved safety performance when compared to group feedback alone. Percent safe scores were substantially higher in the SCF condition (own group performance compared to other group’s performance) (mean = 78%) versus the group feedback only condition (mean = 68%). However, the relative applicability of the results from this study to the present discussion is limited because comparisons were made on the performance of two different groups and no individual feedback on individual performance was provided.

Siero et al. (1996) examined the effects of SCF on energy consumption behavior. Participants were employees of two units of a metallurgical company in different parts of the Netherlands (distance: 200 miles). The authors examined the effects of feedback with respect to three types of energy-wasting behaviors, namely shutting off machines, switching off workstation lights, and a remaining set of energy consumption behaviors. In one unit, employees received feedback on their own conservation behavior. In a second unit, employees received feedback on their own performance and the performance of the first unit, i.e., they received comparative

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feedback. The results clearly showed that employees in the comparative feedback condition saved more energy than employees who only received information about their own performance, even six months after the intervention. Employees in the SCF condition reduced their energy-wasting behavior from 74.1% (pretest) to 22.6% (second post-test). In contrast, the energy savings of employees who received feedback only on their own performance returned to baseline levels after a temporal reduction of energy-wasting behavior. As with the Williams and Geller (2000) study, Siero et al. (1996) reported comparisons on the performance of two different groups and did not provide individual feedback on individual performance. One important finding was that employees in the comparative feedback condition sustained their energy-saving performance after the end of the study and in the absence of feedback.

In the most directly related study, Goltz et al. (1989) compared the effects of group feedback with individual plus group feedback. The authors used an ABCB reversal design to examine the effects of individual and group feedback on product handling behavior under (A) no feedback, (B) group feedback, and (C) group feedback plus individual feedback. Participants were 20 day-shift employees from one department in a microelectronics plant. Results showed that significant performance improvements ($p < 0.001$) were obtained when individual feedback was added to group feedback. However, performance did not decrease significantly ($p > 0.05$) when individual feedback was removed during the second group feedback condition. Thus, it cannot be concluded that performance improvements were directly caused by the addition of individual feedback. As the authors suggest, the increase in
performance with the introduction of individual feedback may have been due to other factors that occurred concurrently with the intervention, e.g., history, or to the effect of learning. Related to this is the possibility that it may be impossible to truly withdraw individual feedback once it has been introduced. Once an individual is informed, although individual feedback may no longer be administered, the individual may be better able to judge whether good or poor performance can be attributed to his or her own behavior.

As stated previously, the inclusion of comparative group feedback in the McGee (2004) study eliminated a confound in previous studies (see The effects of group incentives on high performance). Recall that participants received individual and group feedback with both individual and group incentives during the final phases (CDC) of the study. The inclusion of comparative feedback was provided as a control to insure that decreases that were observed could be attributed to decreased earnings and not to the participant’s awareness that he/she was a high performer. Results from McGee et al. (2005) revealed that high performers performed lower when paid group incentives with individual and group feedback (D) than when paid individual incentives with individual and group feedback (C) although the decreases were not significant (p > 0.05). Performance did increase significantly (p < 0.01) when participants were switched from the group incentive phase (D) to the final individual incentive phase (C). The reduction in performance was likely due to decreases in the amount of money earned rather than to the comparative feedback because (a) participants who were paid individual incentives did not decrease their performance
when switched from individual feedback to comparative feedback, i.e., individual and
group feedback (phases BC) \( p > 0.05 \), and (b) participants received comparative
feedback when they received both individual and group incentives during the final
phases (CDC). Thus, any decreases in performance were likely due to decreases in
earnings rather than to the comparative feedback.

We could find no evidence in the business and industry literature to suggest
that social comparison feedback is commonly provided when group incentives are
also provided. Thus, as is common practice in business and industry, participants in
the present study received individual performance feedback along with the individual
monetary incentives and group feedback along with the group monetary incentives, in
other words, comparative feedback was not provided.

During the group incentive phase, the groups were "simulated." That is, the
performance of the other members of the group was contrived. Simulated groups have
been used in a number of experiments that have examined the effects of group
membership on individual performance (e.g., Harcum & Badura, 1990; Kerr &
Bruun, 1983; Szymanski & Harkins, 1987; White, Kjelgaard, & Harkins, 1995) and
the results have been consistent with investigations that have used actual groups (e.g.,
Brickner, Harkins, & Ostrom, 1986; Harkins & Szymanski, 1989; London & Oldham,
relevantly, both Honeywell et al. (2002) and McGee (2004) successfully used
simulated groups when examining the relative effects of hourly pay, individual
incentives and group incentives on high performance. There are two main advantages
of using simulated rather than actual groups. First, the extent to which a participant's performance differs from the group's performance can be controlled. Second, idiosyncratic social contingencies within the groups cannot differentially affect the performance of participants.

To reiterate, the primary objectives of the present study were to examine the effects of individual and group monetary incentives on the performance and satisfaction of high performers. The current study also examined whether high performers would (a) decrease their performance when switched from individual incentives to group incentives initially, and (b) increase their performance when reversed from group incentives to individual incentives. As noted above, although the feedback procedures used in the study (individual feedback with individual incentives and group feedback with group incentives) do not eliminate the potential confound that performance may decrease due to information that performers are high performers, the feedback procedures more accurately replicate those used in actual business settings than the feedback procedures used in McGee (2004).
Method

Participants

Participants were 11 college students recruited from junior and senior level psychology classes at Western Michigan University (see Appendix A for the recruitment script). They were screened according to three criteria. First, only keyboard proficient participants, i.e., those who correctly processed at least 750 checks per 45 minutes, were included. This criterion was based on the performance of high performers who participated in McGee’s study (2004). The criterion was required because the purpose of the study was to examine the effects of individual and group monetary incentives on high performance. Second, only participants who self-reported that they played computer games for at least one hour each week were included (see Appendix B for the screening questionnaire). Computer games were provided to simulate the availability of competing off-task activities in the workplace. If the computer games were not attractive to students, they would not serve the intended function of being attractive off-task activities. Third, only participants who scored 100% on a quiz testing their understanding of the pay systems to be used in the study were included (see Appendix C for the pay systems quiz). The quiz was administered after the experimenter explained the different pay systems to the participant. Participants were asked to sign the consent form (see Appendix D) before they were screened for inclusion in the study. Only participants who signed the
informed consent form approved by Western Michigan University’s Human Subjects
Institutional Review (HSIRB) were included in the study.

Setting

Sessions were conducted in three on-campus laboratories in 2510, 2512 and 2514 Wood Hall. Each laboratory contained one Dell computer. The three computers were networked through a Local Area Network (LAN). The computer network increased the likelihood that participants would believe that their performance was being combined with the performance of other individuals during the group incentive condition. Each computer workstation included an adjustable chair, Dell computer, color monitor, keyboard, mouse, and gel palm rest.

Experimental Task and Alternative Activities

Participants performed a computerized data entry task that was modeled after the job of a proof operator in a bank. Simulated bank checks, ranging in value from $10.00 to $999.99, were presented on the computer screen (see Appendix E). Participants entered a cash value in a box at the bottom right corner of the computer screen, using the computer’s numeric keypad. After the participant entered the cash value and after he/she pressed the enter key to complete the transaction, the next check was presented.

Participants also had access to seven computer games (FreeCell, Hearts, Minesweeper, Pinball, Solitaire, Spider Solitaire, and Tetris) and were able to play them at any time. In order to access the computer games, participants had to minimize (but not close) the experimental task program. An alternative task was necessary
because without it participants may have spent all of their time performing the check
task because they had nothing else to do. This could have eliminated any performance
differences under the pay systems due to differences in the time spent off-task.

**Dependent Variables**

The primary dependent variables were (a) the total number of checks correctly
completed per session, (b) the percentage correct per session, (c) the time spent
performing the experimental task, and (d) the rate of correct check completion. The
percentage correct measure (number of checks correctly completed divided by total
number of checks completed multiplied by 100) was used to determine whether
performance changes were due to changes in accuracy and whether the pay systems
differentially affected quality. Rate was calculated by dividing the number of checks
completed correctly by time on task (in minutes).

The computer program automatically recorded the total number of checks
completed, the number of checks completed correctly and incorrectly, and time (in
seconds) spent off-task. The computer program began to record time (in seconds) as
off-task when the participant had not entered a value in the check program for 10
seconds, and continued recording the time as off-task until the participant entered a
value in the check program.

All data were saved electronically in the participant’s unique computer file, to
a back-up diskette, and were recorded by hand on a data sheet after each experimental
session (see Appendix F). These precautionary steps were taken to insure that data
were not lost due to a computer malfunction.
Three secondary dependent variables measured participant satisfaction. At the end of the study, participants were asked to rank order the three pay systems (hourly pay, individual incentive pay, and group incentive pay) in terms of preference, how stressful they were, and how satisfied they were with each. The questionnaire is provided in Appendix G.

Experimental Design

A within-subject reversal design was used. Each participant was exposed to the pay and feedback conditions in an ABCB sequence, where A = hourly pay with individual feedback, B = individual incentives with individual feedback, and C = group incentives with group feedback. The performance of each participant was compared to his/her own performance during different phases.

Participants were paid hourly during the first phase of the study in order to demonstrate that the monetary incentives improved performance. Without such a demonstration, it would not be possible to validly compare the effects of the two different incentive pay systems. Even though this control has been demonstrated previously in a pilot study and a previous study (McGee, 2004), that is, performance increased when participants were switched from hourly pay to incentive pay, the inclusion of this phase increased the internal validity of this study.

In the present study, participants received individual feedback with individual incentives and group feedback with group incentives. This configuration of feedback did not include social comparison feedback, and thus performance changes during the group incentive condition may have occurred because of the decreased pay or the
comparative feedback indicating that the performance of the participant was higher than the group's performance. That is, any changes that occurred cannot be attributed solely to the decreased pay resulting from the group incentives. In work settings, however, employees do not typically receive group feedback with individual incentives, or individual feedback with group incentives. Thus, it was hoped that the arrangement of incentives and feedback would increase the ecological validity of the present study.

During the group incentive phase (C), participants were told that their pay was based on the average performance of a 10-person group to which they were assigned. However, the group was “simulated.” That is, there was not a “real” group; rather, the performance of the other nine members was contrived so that the performance of the participant was approximately 25% higher than the average performance of the group. The specific method for calculating the contrived group performance is described in the Independent Variable section. Although only “high performers” were selected as participants, this procedure insured that the performance of each participant differed from the group by the same extent (which could influence the performance of participants).

Experimental sessions were 45 minutes in duration. Each participant attended at least five sessions per phase. If performance was not stable after five sessions, that is, if the number of checks correctly processed is not within + or – 10% of the first of three consecutive sessions, the phase was extended until performance was stable or until the participant had completed 10 sessions (for economic reasons, phases could
not be extended beyond 10 sessions). Each participant attended from three to five sessions per week, depending upon his/her availability.

Independent Variable

Participants worked alone in all phases of the study, but in the group pay condition they were told that their pay was based on the average performance of a 10-person work group.

Hourly Pay with Individual Feedback (A)

During the hourly pay phase, participants were paid $5.75 for each 45-minute session if they correctly completed at least 300 checks. This minimum was based on the performance of pilot participants, and was approximately two standard deviations below their average performance on the same task when they were paid hourly. The inclusion of a minimum performance criterion decreased the likelihood that participants would not perform the task at all. In work settings, employees must perform at minimum levels to avoid supervisory criticism and being fired. This minimum requirement was designed to simulate that contingency.

Immediately before each session participants were given a receipt that indicated the total number of checks they completed correctly and the amount of money they earned in their previous session (Appendix H). Receipts were given to participants before they began their session rather than immediately after each session because if participants received the group feedback immediately after the sessions during the simulated group condition, it would have decreased the likelihood that they would believe that their performance was being combined with that of nine other
individuals. In order to control for potential confounds due to the timing of the feedback, the same feedback procedure was used in all pay conditions. As indicated in the Experimental Design section, this phase lasted from 5 to 10 sessions, depending upon when the performance of the participant stabilized.

Participants were paid in cash before their first session of the week or immediately before the first session of the next pay phase. The feedback script that was used in this and all subsequent conditions is provided in Appendix I.

*Individual Incentive Pay with Individual Feedback (B)*

During the individual incentive condition, participants earned $.006 per check processed correctly. They earned $5.75, an amount equal to the hourly pay, if they correctly processed 960 checks per session. This equivalency was based on the average performance of participants in McGee (2004) who were paid incentives. Participants who processed more than 960 checks earned more money because of the incentive pay.

Before each session, participants were given a receipt that indicated the total number of correctly processed checks and the amount of money they earned during the previous session (Appendix J). They were paid in cash before their first session of the week or immediately before the first session of the next phase. As with the other phases, this phase lasted from 5 to 10 sessions, depending upon when the performance of the participant stabilized.

*Group Incentive Pay with Group Feedback (C)*

During the group incentive condition, the participant’s pay was based on the
average performance of the simulated group. Similar to the individual incentive condition, participants received $.006 per correctly processed check in the group average. Thus, participants earned $5.75 per session if the group average was 960 checks. The group’s average performance was calculated so that it was about 25% (range 23%-27%, randomly determined in advance) lower than the average performance of the participant during the last three sessions of the individual monetary incentive phase, i.e., after performance was stable. The formula was: 

\[(\text{about } .75 \times \text{mean performance for last three sessions} \times 9) + \text{participant’s current session performance}\]/10. Ensuring that the group’s average was 25% lower than the participant’s controlled the extent to which an individual’s performance differed from the group’s, which may affect performance under the group incentives.

Before each session, participants were given a receipt that indicated the average number of checks completed correctly by the simulated group, and the amount of money they earned for that session based on the group average (Appendix K). They were paid in cash before their first session of the week or immediately before the first session of the next phase. As with the preceding phases, this phase lasted from 5 to 10 sessions until the participant’s performance stabilized.

*Independent Variable Integrity*

To insure that the computer program was accurately recording the data, the experimenter tested it before the start of the first session each week. To insure correct payment and to reduce the possibility of computational errors, a pay chart (see Appendix L) was used. During the individual incentive pay condition, the
experimenter compared the participants' number of correctly processed checks, recorded by the computer program, to the pay chart to determine the amount of pay to be provided based on their individual performance. During the group incentive pay condition, the experimenter calculated the simulated group's average performance by entering the participants' number of correctly processed checks, recorded by the computer program, into the mathematical formula described in the Group Incentive Pay with Group Feedback condition. The resulting value was compared to the pay chart to determine the amount of pay to be provided to the participant based on the simulated group's average performance. A second experimenter verified the calculation and pay for 30% of the experimental sessions. Interobserver agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements, then multiplying by 100. It equaled 99%.

In order to insure that the pay systems and feedback were administered correctly, the experimenter read from prepared scripts (see Appendix I). Before the start of each session, the experimenter read a scripted description of the pay system in effect. In addition, the experimenter read from a script when providing participants with feedback regarding their performance from the preceding session.

Experimental Procedure

Participants worked alone, out of view from and proximity to other participants. Participants were asked to refrain from using their cell phones during each session. This was done to reduce the likelihood that participants would engage in alternative concurrent activities (e.g., talking with others either in person, or by cell
phone) while performing the experimental task. The intended off-task activity, playing computer games, could not be done concurrently with performing the experimental task.

Introductory Session

Potential participants were paid $5.75 for attending an introductory session. During the session, the three pay systems, the pay procedures and time requirements were explained, and consent was sought. If consent was obtained, potential participants were screened using the criteria described in the Participants section. Potential participants who did not wish to continue their participation or who did not meet the criteria were paid $5.75 and dismissed. Those who did meet the inclusion criteria were invited to participate in the study and experimental sessions were scheduled. Participants scheduled at least three sessions per week. They were also paid $5.75 immediately following the introductory session.

Experimental Sessions

Before the start of the first session of the study, the experimenter reviewed the different pay systems with the participants. The experimenter also demonstrated how to enter values into the computer program, how to minimize and maximize the computer program, and how to access the computer games.

Participants were paid before their first session of the week or immediately before the first session of a new pay phase. Before the first session of each pay condition, the experimenter described the pay system that was in effect and the associated payment procedure. Before each session within a pay phase, the
experimenter reminded participants of the pay system in effect for that session. Before the start of all sessions, except their first, participants were given a session receipt that indicated their performance from the previous session as described in the *Independent Variable* section. In addition, the experimenter reminded participants that talking on their cell phones was prohibited during the session, that computer games were available on the computer, and that they were free to take breaks whenever desired. The experimental session began when the first check appeared on the computer screen.

In order to control for reactivity to the experimenter, the experimenter was not present in the computer laboratory during sessions. If the experimenter was present, participants may have been less likely to engage in off-task activities (Matthews & Dickinson, 2000). After 45 minutes, the experimenter re-entered the room, ended the session, thanked the participants for their time, and reminded them of their next session date and time.

*Debriefing Session*

Upon completion of their last experimental session, participants were asked to schedule a debriefing session. The debriefing sessions were held in Room 2532, Wood Hall. Participants were asked to complete the Satisfaction and Stress Level Questionnaire (Appendix G). After participants completed the questionnaire, the experimenter explained the purpose of the study by reading the debriefing script (Appendix M) and answered participants’ questions.
Protocol clearance from the Human Subjects Institutional Review Board was obtained for this project (Appendix N).
Results

Data will be presented first in terms of average performance per phase for each participant for each dependent variable to provide an overall summary of the results. Then, session by session data will be presented for each participant comparing across all dependent variables.

Overall Task Performance

Total Number of Checks Completed Correctly

Table 1 displays the average number of checks completed correctly per phase by each participant.

Participant performance on the computer task varied under the different pay phases. Nine of the eleven participants (P70, P72, P74, P76, P77, P78, P80, P83, and P84) performed higher during the first individual incentive phase (B) than during the hourly pay phase (A). Thus, for these participants the monetary incentives controlled performance permitting a valid comparison between the individual incentive phases and group incentive phase. The remaining 2 participants (P75 and P82) performed lower during the first individual incentive phase (B) than during the hourly pay phase (A). Thus, the monetary incentives did not control their performance effectively. Furthermore, their performance decreased across all phases of the study.

Of the nine participants whose performance was controlled by the individual incentives, seven performed higher during both individual incentive phases than during the group incentive phase. Participant 70’s performance increased across all
Table 1

Average Number of Checks Completed Correctly by Each Participant

<table>
<thead>
<tr>
<th>P#</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>670 (209.62)</td>
<td>1120 (19.24)</td>
<td>1125 (64.28)</td>
<td>1185 (17.12)</td>
</tr>
<tr>
<td>72</td>
<td>858 (73.64)</td>
<td>1182 (50.38)</td>
<td>1063 (164.01)</td>
<td>1216 (48.50)</td>
</tr>
<tr>
<td>74</td>
<td>621 (27.37)</td>
<td>679 (109.09)</td>
<td>458 (75.98)</td>
<td>527 (88.05)</td>
</tr>
<tr>
<td>75</td>
<td>656 (77.31)</td>
<td>514 (164.66)</td>
<td>320 (99.67)</td>
<td>237 (31.93)</td>
</tr>
<tr>
<td>76</td>
<td>718 (220.02)</td>
<td>1116 (137.01)</td>
<td>981 (141.04)</td>
<td>1259 (19.54)</td>
</tr>
<tr>
<td>77</td>
<td>651 (154.48)</td>
<td>1003 (35.60)</td>
<td>877 (200.24)</td>
<td>1001 (55.56)</td>
</tr>
<tr>
<td>78</td>
<td>825 (190.39)</td>
<td>1054 (33.71)</td>
<td>716 (443.55)</td>
<td>293 (110.88)</td>
</tr>
<tr>
<td>80</td>
<td>700 (76.46)</td>
<td>945 (37.73)</td>
<td>920 (163.71)</td>
<td>1100 (30.65)</td>
</tr>
<tr>
<td>82</td>
<td>480 (50.85)</td>
<td>477 (130.31)</td>
<td>355 (126.21)</td>
<td>304 (105.16)</td>
</tr>
<tr>
<td>83</td>
<td>910 (73.01)</td>
<td>1289 (74.05)</td>
<td>1219 (50.37)</td>
<td>1338 (29.90)</td>
</tr>
<tr>
<td>84</td>
<td>661 (110.54)</td>
<td>778 (84.67)</td>
<td>663 (63.63)</td>
<td>739 (58.95)</td>
</tr>
<tr>
<td>AVG</td>
<td>705 (120.91)</td>
<td>923 (273.48)</td>
<td>791 (312.04)</td>
<td>836 (428.44)</td>
</tr>
</tbody>
</table>

Note: A = Hourly Pay; B = Individual Incentive Pay; C = Group Incentive Pay. Standard deviations are in parentheses.

Phases of the study whereas, P78 performed substantially lower during the final individual incentive phase than during all previous phases.

Accuracy

Table 2 displays average accuracy (calculated as percent correct) per phase for each participant. Accuracy of all participants was high and stable across all phases.
Table 2

Average Accuracy (Percent Correct) for Each Participant

<table>
<thead>
<tr>
<th>P#</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>98.02 (1.20)</td>
<td>98.42 (0.26)</td>
<td>98.72 (0.36)</td>
<td>98.04 (0.34)</td>
</tr>
<tr>
<td>72</td>
<td>96.67 (0.75)</td>
<td>95.56 (1.62)</td>
<td>95.04 (0.98)</td>
<td>95.97 (0.64)</td>
</tr>
<tr>
<td>74</td>
<td>99.32 (0.43)</td>
<td>99.11 (0.36)</td>
<td>98.50 (0.89)</td>
<td>98.62 (0.54)</td>
</tr>
<tr>
<td>75</td>
<td>99.36 (0.37)</td>
<td>99.16 (0.47)</td>
<td>99.36 (0.51)</td>
<td>99.32 (0.42)</td>
</tr>
<tr>
<td>76</td>
<td>98.47 (0.52)</td>
<td>97.84 (0.35)</td>
<td>98.75 (0.46)</td>
<td>99.00 (0.55)</td>
</tr>
<tr>
<td>77</td>
<td>98.65 (0.45)</td>
<td>98.44 (0.11)</td>
<td>98.40 (0.47)</td>
<td>97.84 (0.51)</td>
</tr>
<tr>
<td>78</td>
<td>95.32 (1.03)</td>
<td>94.76 (1.18)</td>
<td>94.33 (1.37)</td>
<td>94.12 (2.39)</td>
</tr>
<tr>
<td>80</td>
<td>98.70 (0.42)</td>
<td>99.00 (0.20)</td>
<td>99.03 (0.44)</td>
<td>98.98 (0.44)</td>
</tr>
<tr>
<td>82</td>
<td>94.12 (2.67)</td>
<td>98.28 (0.96)</td>
<td>97.39 (1.22)</td>
<td>96.58 (1.91)</td>
</tr>
<tr>
<td>83</td>
<td>98.31 (0.72)</td>
<td>97.62 (0.59)</td>
<td>98.57 (0.86)</td>
<td>97.96 (0.37)</td>
</tr>
<tr>
<td>84</td>
<td>98.46 (0.43)</td>
<td>99.03 (0.38)</td>
<td>98.93 (0.43)</td>
<td>98.99 (0.23)</td>
</tr>
<tr>
<td>AVG</td>
<td>97.76 (1.69)</td>
<td>97.93 (1.47)</td>
<td>97.91 (1.68)</td>
<td>97.77 (1.60)</td>
</tr>
</tbody>
</table>

Note: A = Hourly Pay; B = Individual Incentive Pay; C = Group Incentive Pay. Standard deviations are in parentheses.

During the monetary incentive phases of the study, accuracy did not decrease as the number of checks completed correctly increased. This may be due, at least in part, to the fact that a quality control measure was included in the study; each participant's earnings were based on the number of checks completed correctly and not the total number of checks completed regardless of accuracy. In summary,
changes in performance were not associated with changes in accuracy, and the monetary incentive systems did not differentially affect quality.

**Time on Task**

Table 3 displays the average time (min) on task per phase for each participant.

**Table 3**

Average Time on Task for Each Participant

<table>
<thead>
<tr>
<th>P#</th>
<th>A (min) ± SD</th>
<th>B (min) ± SD</th>
<th>C (min) ± SD</th>
<th>B (min) ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>29.27 (9.22)</td>
<td>44.77 (0.43)</td>
<td>44.59 (0.50)</td>
<td>45.00 (0.00)</td>
</tr>
<tr>
<td>72</td>
<td>36.02 (1.86)</td>
<td>44.24 (0.84)</td>
<td>37.67 (5.42)</td>
<td>43.48 (1.06)</td>
</tr>
<tr>
<td>74</td>
<td>39.86 (2.98)</td>
<td>35.56 (5.75)</td>
<td>26.17 (6.32)</td>
<td>25.67 (7.99)</td>
</tr>
<tr>
<td>75</td>
<td>34.26 (3.85)</td>
<td>25.14 (6.06)</td>
<td>15.71 (3.81)</td>
<td>15.39 (7.73)</td>
</tr>
<tr>
<td>76</td>
<td>26.84 (6.24)</td>
<td>38.80 (4.40)</td>
<td>31.66 (5.04)</td>
<td>42.00 (1.36)</td>
</tr>
<tr>
<td>77</td>
<td>31.96 (8.36)</td>
<td>43.28 (3.10)</td>
<td>38.11 (8.32)</td>
<td>42.50 (2.37)</td>
</tr>
<tr>
<td>78</td>
<td>36.93 (9.05)</td>
<td>44.56 (0.36)</td>
<td>29.22 (17.16)</td>
<td>11.66 (4.35)</td>
</tr>
<tr>
<td>80</td>
<td>38.15 (4.54)</td>
<td>44.17 (0.38)</td>
<td>40.02 (6.80)</td>
<td>44.35 (0.27)</td>
</tr>
<tr>
<td>82</td>
<td>33.03 (2.04)</td>
<td>27.47 (6.44)</td>
<td>21.69 (9.07)</td>
<td>19.71 (6.60)</td>
</tr>
<tr>
<td>83</td>
<td>33.73 (2.86)</td>
<td>44.86 (0.31)</td>
<td>44.41 (0.14)</td>
<td>44.64 (0.22)</td>
</tr>
<tr>
<td>84</td>
<td>35.10 (5.96)</td>
<td>35.62 (2.44)</td>
<td>29.66 (3.28)</td>
<td>31.67 (2.82)</td>
</tr>
<tr>
<td>AVG</td>
<td>33.20 (3.46)</td>
<td>38.95 (7.21)</td>
<td>32.63 (9.28)</td>
<td>33.28 (12.99)</td>
</tr>
</tbody>
</table>

*Note:* A = Hourly Pay; B = Individual Incentive Pay; C = Group Incentive Pay. Standard deviations are in parentheses.
Seven participants (P70, P72, P76, P77, P78, P80, and P83) increased the average time spent on task during the first individual incentive phase (B) when switched from the hourly pay phase (A). This is generally consistent with overall changes in task performance (see Table 1). The most dramatic increase in time on task was observed in P70 whose average time on task during the first individual incentive phase (B) increased by 15.5 minutes over the hourly pay phase (A). Three participants (P74, P75, and P82) spent less time on task during the first individual incentive phase (B) than during the hourly incentive phase (A). The remaining participant’s (P84) average time on task did not change when switched from the hourly pay phase (35.10 minutes) to the first individual incentive phase (35.62 minutes).

The average time on task for all but two participants (P70 and P83) decreased when they were switched from the first individual incentive phase (B) to the group incentive phase (C). Five participants (P72, P76, P77, P80, and P84) spent more time on task during the final individual incentive phase (B) than during the group incentive phase. The average time on task for P70 and P83 was relatively equal during the final three phases (B-C-B) of the study. A decreasing trend in the amount of time spent on task across all phases of the study was observed for 3 participants, P74, P75 and P82. After an initial increase in time spent on task during the first individual incentive phase, P78 decreased the time spent on task during the final two phases (C-B).

**Rate of Performance**

Table 4 displays the average rate of check completion per phase for each
participant. Rate was calculated by dividing the number of checks completed correctly by time on task (in minutes).

**Table 4**

Average Rate of Check Completion for Each Participant

<table>
<thead>
<tr>
<th>P#</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>22.93 (0.53)</td>
<td>25.03 (0.23)</td>
<td>25.32 (1.44)</td>
<td>26.33 (0.38)</td>
</tr>
<tr>
<td>72</td>
<td>23.82 (1.74)</td>
<td>26.71 (0.85)</td>
<td>27.27 (1.62)</td>
<td>27.95 (0.90)</td>
</tr>
<tr>
<td>74</td>
<td>16.41 (1.23)</td>
<td>18.87 (0.61)</td>
<td>18.39 (4.41)</td>
<td>20.08 (1.76)</td>
</tr>
<tr>
<td>75</td>
<td>19.23 (1.96)</td>
<td>20.15 (1.58)</td>
<td>20.13 (1.37)</td>
<td>18.72 (2.18)</td>
</tr>
<tr>
<td>76</td>
<td>26.85 (5.23)</td>
<td>28.75 (0.62)</td>
<td>31.04 (1.46)</td>
<td>30.00 (0.94)</td>
</tr>
<tr>
<td>77</td>
<td>20.60 (1.49)</td>
<td>23.28 (2.05)</td>
<td>22.94 (0.61)</td>
<td>23.66 (0.54)</td>
</tr>
<tr>
<td>78</td>
<td>22.44 (1.01)</td>
<td>23.63 (0.68)</td>
<td>22.81 (4.33)</td>
<td>25.12 (0.75)</td>
</tr>
<tr>
<td>80</td>
<td>18.41 (1.41)</td>
<td>21.38 (0.74)</td>
<td>22.99 (1.18)</td>
<td>24.77 (0.60)</td>
</tr>
<tr>
<td>82</td>
<td>14.47 (1.61)</td>
<td>17.28 (1.99)</td>
<td>17.06 (2.79)</td>
<td>15.54 (2.45)</td>
</tr>
<tr>
<td>83</td>
<td>27.01 (0.79)</td>
<td>28.74 (1.51)</td>
<td>27.45 (1.13)</td>
<td>29.96 (0.66)</td>
</tr>
<tr>
<td>84</td>
<td>18.87 (1.59)</td>
<td>21.78 (1.02)</td>
<td>22.31 (0.65)</td>
<td>23.52 (0.74)</td>
</tr>
<tr>
<td>AVG</td>
<td>21.00 (4.03)</td>
<td>23.24 (3.82)</td>
<td>23.52 (4.07)</td>
<td>24.15 (4.58)</td>
</tr>
</tbody>
</table>

*Note:* A = Hourly Pay; B = Individual Incentive Pay; C = Group Incentive Pay. Standard deviations are in parentheses.

All participants performed at higher rates during the first individual incentive phase (B) than during the hourly pay phase (A). Five participants (P74, P77, P78, P82, and P83) performed at lower rates during the group incentive phase (C) than
during the first individual incentive phase (B). Additionally, all but three participants (P75, P76 and P82) performed at higher rates during the second individual incentive phase (B) than during the group incentive phase (C). Five participants (P70, P72, P76, P80, and P84) performed at higher rates during the group incentive phase (C) than during the first individual incentive phase (B). The remaining participant (P75) performed at the same rate during the final two phases (C-B).

**Individual Comparisons of Average Task Performance to Rate and Time on Task**

To illustrate the relationship between three of the dependent variables, i.e., number of checks completed correctly, time on task, and rate of performance, the average performance for each participant across phases is presented in Figures 1 through 4. These summary data help to highlight whether average changes in task performance across phases were related to changes in rate, time on task, or both. Accuracy did not vary across phases and was not included in the comparisons.

The white bars on each graph represent the number of checks completed correctly and the measurement scale is presented on the primary y-axis displayed on the left side of the graph (range 0 – 1400). The open circles (o) represent time on task in minutes, the closed circles (●) represent rate of performance (checks completed per minute), and the measurement scale for both is presented on the secondary y-axis displayed on the right side of the graph (range 0 – 45).

For all but three participants (P74, P82, and P83), overall changes in performance across phases appeared to be due to time spent on task, rather than rate.
Figure 1. Average performance across phases for P70, P72, and P74.
Figure 2. Average performance across phases for P75, P76, and P77.
Figure 3. Average performance across phases for P78, P80, and P82.
Figure 4. Average performance across phases for P83 and P84.

of performance or some combination of the two. The association between checks completed correctly and time on task is most clearly seen with the data for P72.

Individual Participant Task Performance

Individual participant task performance data by session are presented and analyzed to determine trends through visual inspection. Four graphs are presented for each participant to illustrate performance by session as follows: (1) checks completed
correctly, (2) rate of check completion, (3) time on task, and (4) percent correct.

Participants with similar data trends on task performance are grouped together.

Performance was considered to have increased or decreased during a phase based on visual inspection, and across phases if the average performance, i.e., number of checks completed correctly, changed by at least fifty checks.

*Participants Whose Performance Decreased During the Group Incentive Phase and Increased During the Final Individual Incentive Phase*

Participants 72, 74, 76, 77, 83, and 84 exhibited similar trends in performance, i.e., the number of checks completed correctly, across all phases (Figures 5 - 10). Their performance increased when switched from the hourly pay phase (A) to the first individual incentive phase (B), decreased when switched to the group incentive phase (C), and increased when reversed to the final individual incentive phase (B). For participants 72, 76, 77, and 84, overall changes in number of checks completed appeared to correspond with changes in time on task, rather than rate of performance.

*Participant 72.* Figure 5 displays performance data by session for P72. During the hourly pay phase, when the minimum check criterion was in effect, the number of checks completed correctly decreased gradually. Changes in performance during this phase appear to be due to changes in rate of performance, rather than to time on task. In other words, increases in performance were marked by increases in rate of performance and decreases marked by decreases in rate of performance.

During the first individual incentive phase (B), performance was substantially higher than during the hourly pay phase (A). Performance was relatively stable during
Figure 5. Task performance data by session for P72.
Figure 6. Task performance data by session for P74.

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Figure 7. Task performance data by session for P76.
Figure 8. Task performance data by session for P77.
Figure 9. Task performance data by session for P83.
Figure 10. Task performance data by session for P84.

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this phase and changes in the number of checks completed correctly appear to be due to some combination of changes in both rate of performance and time on task. During the first two sessions of the group incentive phase (C), the number of checks completed correctly was comparable to the number completed during the individual incentive phase (B), then decreased sharply during the third session and remained low for the final two sessions. The decreases in performance correspond to sharp decreases in time on task and inversely with increases in rate of performance. When switched to the final individual incentive phase, P72's performance increased and surpassed previous performance under the first individual incentive phase (B). As with the first individual incentive phase (B) performance changes during the final phase appear to be due to some combination of changes in both rate of performance and time on task. Accuracy was high and stable across all phases of the study.

Participant 74. Figure 6 displays performance data by session for P74. P74's performance increased initially when switched from the hourly pay phase (A) to the first individual incentive phase (B) and decreased gradually during this phase. These performance changes appear to correspond with changes in time on task, rather than to changes in the rate of performance. P74's performance decreased further when switched to the group incentive phase. Performance changes correspond with changes in time on task for all sessions except the final session when a sharp decrease in rate of performance corresponded with the low performance. When switched to the final individual incentive phase (B), performance increased when compared to the group incentive phase (C) but failed to increase to previous levels when compared to the
first individual incentive phase (B). Changes in performance during the final phase appear to be due to changes in time on task, rather than to rate of performance. That is, changes in performance were marked by similar changes in time on task. During the last session, a sharp decrease in time on task and a higher rate on performance combined to result in an overall decrease in number of checks completed correctly. Accuracy of check completion was high and stable across all phases of the study.

**Participant 76.** Figure 7 displays performance data by session for P76. During the hourly pay phase, when the minimum check criterion was in effect, the number of checks completed correctly and time on task decreased substantially, except for the final session. During the final session in the hourly pay phase, time on task increased and rate of performance decreased resulting in a marked decreased in performance. The participant's performance and time on task increased considerably at the start of the first individual incentive phase (B), and then both measures decreased over the next three sessions before rebounding during the final four sessions. During the group incentive phase (C), changes in overall task performance correspond fairly well with changes in the amount of time spent on task. Thus, during the first three phases (A-B-C), increases in performance were marked by increases in time on task and decreases marked by decreases in time on task. During the final individual incentive phase (B), performance surpassed previous levels under the first individual incentive phase (B). Initially, this increase was accompanied by an increase in time on task and a slight decrease in rate of performance. As the phase continued, the number of checks completed remained very stable while time on task decreased slightly and rate
increased slightly. Rate of performance was high and stable during both individual incentive phases (B), and was high and comparably more variable during the group incentive phase (C). Accuracy of check completion was high and stable across all phases of the study.

Participant 77. Figure 8 displays performance data by session for P77. During the hourly pay phase, the number of checks completed correctly decreased gradually except for session five when performance increased markedly. Performance changes in this phase appear to correspond to changes in time on task, rather than rate of performance. Rate was relatively stable during the hourly pay phase (A) except for the final session when it increased sharply compared to the preceding eight sessions. Participant 77's performance and time on task increased substantially and were relatively stable when switched to the first individual incentive phase (B), remained high and stable during the first four sessions in the group incentive phase (C) before decreasing, and then, returned to high and stable levels during the final individual incentive phase (B). During all phases (A-B-C-B), changes in overall task performance corresponded fairly well with changes in the amount of time spent on task, rather than rate of performance. Rate of performance was stable across all sessions with the exception of sessions nine and ten when it increased appreciably. Accuracy of check completion was high and stable across all phases of the study.

Participant 83. Figure 9 displays performance data by session for P83. During the hourly pay phase, the number of checks completed correctly decreased initially and then leveled off during the final sessions of the phase. Performance changes in
this phase appear to correspond to changes in time on task, rather than rate of performance. Rate was relatively stable during the hourly pay phase (A). Participant 83’s performance increased substantially when switched to the first individual incentive phase (B), decreased during the group incentive phase (C), and then, returned to high and stable levels, surpassing all previous performance during the final individual incentive phase (B). During the final three phases (B-C-B), time on task remained at or very near the entire 45 minutes. Thus, any changes in performance during these phases were necessarily due to changes in the rate of performance. Accuracy of check completion was high and stable across all phases of the study.

**Participant 84.** Figure 10 displays performance data by session for P84. P84’s performance increased initially when switched from the hourly pay phase (A) to the first individual incentive phase (B), decreased during the second session and then increased during the final four sessions in this phase. The participant’s performance decreased when switched to the group incentive phase (C) and reversed to previously higher levels during the final individual incentive phase (C). During all phases (A-B-C-B), changes in overall task performance corresponded fairly well with changes in the amount of time spent on task, rather than rate of performance. Rate of performance was stable across all sessions. Accuracy of check completion was high and stable across all phases of the study.

**Participant Whose Performance Decreased During the Group Incentive Phase but Failed to Increase During the Final Individual Incentive Phase**

Participant 78’s performance increased when switched from the hourly pay
phase (A) to the first individual incentive phase (B), decreased during the group incentive phase (C) and continued to decrease during the final individual incentive phase (B) (Figure 11). During the hourly pay phase (A), the group incentive phase (C), and the final individual incentive phase (B), changes in overall task performance correspond fairly well with changes in the amount of time spent on task, rather than rate of performance. During the first individual incentive phase (B), changes in rate of performance appear to account for changes in the number of checks completed correctly. Accuracy was high and stable across all phases of the study.

Participants Whose Performance Did Not Change During the Group Incentive Phase and Increased During the Final Individual Incentive Phase

Participants 70 and 80 exhibited similar trends in performance across all phases (Figures 12 and 13). Their performance increased when switched from the hourly pay phase (A) to the first individual incentive phase (B), remained comparable (less than plus or minus 50 checks) when switched to the group incentive phase (C), and increased when reversed to the final individual incentive phase (B). For P70, changes in performance across phases appear to correspond with changes on rate of performance. For P80, performance changes correspond to both changes in time on task and rate of performance.

Participant 70. Figure 12 displays performance data by session for P70. The number of checks completed correctly and time on task decreased dramatically during the hourly pay phase. The participant’s performance and time on task increased substantially and were relatively stable when switched to the first individual incentive phase (B), remained high and stable during the group incentive phase (C), and
Figure 11. Task performance data by session for P78.
Figure 12. Task performance data by session for P70.
Figure 13. Task performance data by session for P80.
continued to be high and stable during the final individual incentive phase (B). Rate of performance increased slightly during the hourly phase (A) and corresponded with the number of checks completed correctly during the next three phases (B-C-B). Furthermore, time on task remained at or very near the entire 45 minutes during the final three phases (B-C-B). Thus, any changes in performance during these phases were necessarily due to changes in the rate of performance. There was a slight decrease in rate of performance during session 18 and this is reflected in fewer checks completed correctly for that session. Accuracy was high and stable across all phases.

Participant 80. Participant 80’s performance increased when switched from the hourly pay phase (A) to the first individual incentive phase (B), remained comparable during the most of the group incentive phase (C) before decreasing sharply at the end of the phase, and then surpassed previous levels during the final individual incentive phase (B) (Figure 13). Performance changes during the hourly pay phase (A) and the group incentive pay phase (C) correspond with changes to time on task. In contrast, performance changes during the individual incentive phases (B) correspond with changes in rate of performance. Accuracy was high and stable across all phases of the study.

Participants Whose Performance Decreased Across All Phases

Participants 75 and 82 displayed similar trends in performance across phases (Figures 14 and 15). Performance decreased when switched to the first individual incentive phase indicating that the incentives did not control their performance. Even so, they were kept in the study to examine what effects, if any, would result from the
Figure 14. Task performance data by session for P75.
Figure 15. Task performance data by session for P82.
interventions. The number of checks completed correctly by P75 and P82 continued to decrease across the final two phases (C-B). Visual analysis of the session by session data suggest that performance changes correspond with changes in time on task rather than rate of performance. Accuracy of check completion was high and stable across all phases.

Amount of Money Earned

Table 5 displays the average amount of money earned per session for each participant. Six participants (P70, P72, P76, P77, P78, and P83) earned, on average, more during the first individual incentive phase than they had during the hourly pay phase. All participants earned less during the group incentive phase than they had during the first individual incentive phase. Notably, P83 earned, on average, $1.25 less during the group incentive than during first individual incentive phase but this was, on average, $0.25 more than she earned during the hourly pay phase. All but three participants (P75, P78, and P82) earned, on average, more during the final incentive phase than during the group incentive phase. The performance of P78 decreased sharply over the final phase of the study, whereas the performance of P75 and P82 decreased across all phases of the study.

As stated previously, all participants earned less during the group incentive phase than they had during the first individual incentive phase. For all but two participants (P70 and P80), decreased earnings were associated with decreased performance during the group incentive phase. Of the remaining nine participants, six increased their performance when switched to the final individual incentive phase.
### Table 5

*Average Amount of Money Earned by Each Participant*

<table>
<thead>
<tr>
<th>P#</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>B</th>
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<tbody>
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<td>$6.70</td>
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<td>$5.75</td>
<td>$4.65</td>
<td>$3.40</td>
<td>$4.45</td>
</tr>
</tbody>
</table>

*Note:* A = Hourly Pay; B = Individual Incentive Pay; C = Group Incentive Pay.

**Preference, Satisfaction, and Stress**

All participants attended a debriefing session following their final session. Participants completed a preference, satisfaction, and stress questionnaire (Appendix G) where they were asked to rank order the three pay systems as either most, second or least, in terms of preference, satisfaction, and stress level (Table 6). After participants completed the questionnaire, the experimenter explained the purpose of
the study, reviewed participants’ data with them, and answered their questions regarding the study.

Table 6
Preference, Satisfaction, and Stress Level Ranks

<table>
<thead>
<tr>
<th>Pay</th>
<th>Preference</th>
<th>Satisfaction</th>
<th>Stress</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Most</td>
<td>Second</td>
<td>Least</td>
</tr>
<tr>
<td>Hrly Pay</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Ind Inc</td>
<td>6</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Grp Inc</td>
<td>0</td>
<td>4</td>
<td>7</td>
</tr>
</tbody>
</table>

Note: One participant commented that there was no difference in stress level between the three pay systems and thus, did not rank order them.

In terms of preference, 6 of 11 participants ranked the individual incentive systems as most preferred and 5 ranked the hourly pay system as the most preferred. Seven of the 11 least preferred the group incentive system.

When asked to explain their preference, those who most preferred the individual incentive system indicated that they had more control over their success and the amount they were paid. Those who most preferred the hourly pay system noted that this pay condition required the least amount of effort. In fact, one participant stated, “during the hourly pay period you could do less and earn more,” and another commented that “the amount of necessary work nearly tripled to reach the initial rate established in the hourly scale.” Thus, it appears that for some participants the response effort associated with the task was more salient to them than
the amount of money they could have earned under the individual incentive pay system.

In terms of satisfaction, six participants (P70, P72, P76, P77, P83, and P84) ranked the individual incentive system as most satisfying, whereas the remaining five ranked the hourly pay system as most satisfying. Nine participants ranked the group incentive system the least satisfying. Participants who indicated that the hourly pay system was most satisfying provided the following reasons for doing so: “it required the least amount of work and had a greater payoff;” “it was the easiest of the 3, by exceeding expectations in the hourly setting there is a sense of performing better for the company;” and “all I had to do was a certain amount of checks and then I could play games or whatever until the time was up.” Participants who ranked the individual incentive system as most satisfying provided the following explanations for their rankings: “I got rewarded highly for my performance, and made the most money.”

In terms of stress level, the majority of participants (8 of 11) found the hourly pay system to be the least stressful, whereas 7 of 11 participants found the group incentive system to be most stressful. Three participants ranked the individual incentive system as most stressful. One participant (P75) noted that there was no difference between the 3 pay systems in terms of stress level and did not rank order them. Participants who ranked the group incentive system as most stressful provided the following explanations for their rankings: “I didn’t want to be the reason everyone in my group didn’t get paid as much;” “no matter how well I did, I didn’t get paid as
much;” “I got angry at the other people in my group because I felt their lack of performance kept me from making money;” and “I felt like my performance hindered performance of the group.” Participants who indicated that the individual incentive system was most stressful provided the following reasons for doing so: “there was no cushion, and what you did was what you were paid for;” “with hourly I could relax, and with individual, I could but wouldn’t make as much;” and “individual was most stressful because I knew my performance determined my pay, group was second because I couldn’t control as much and hourly last because the expectation was less.”

Participants’ written answers and comments provided during the debriefing session may account for some of the data trends observed over the course of the study. For example, when asked why he preferred the hourly pay system versus the other systems, one participant (P75) responded, “the amount of necessary work nearly tripled to reach the initial rate established in the hourly scale.” Visual inspection of his data revealed that there was a substantial increase in performance and time on task during the first session of the first individual incentive phase (Figure 14) but after this session, performance decreased over the remaining phases of the study. The answers and comments highlighted how tangential events can affect performance. For example, P78 reported that she had received a student loan midway through the study. Upon closer inspection of her data she confirmed that she received the loan during the group incentive phase. This corresponded with a marked reduction in performance that continued through the end of the study (Figure 11).
Discussion

The current study examined how hourly pay, individual monetary incentives with individual feedback, and group monetary incentives with group feedback affected the performance and satisfaction of high performers. The results obtained in this study extend previous studies that have attempted to determine the relative effectiveness of individual monetary incentives and group monetary incentives on performance (Allison et al., 1992; Farr, 1976; Honeywell et al., 1997; Honeywell-Johnson et al., 2002; Roberts & Leary, 1990; Smoot, 1997; Stoneman & Dickinson, 1989; Thurkow et al., 2000). Additionally, this study extends the work of McGee (2004) by examining how different types of feedback influence performance under individual and group monetary incentive systems. This knowledge may help businesses better assess the utility and appropriateness of individual and group incentives thereby enabling them to better design pay systems that satisfy both the organization and the employee.

An in-depth analysis of the results is presented first in terms of performance, and then in terms of preference, satisfaction and stress. Following this discussion, implications for business and industry, and suggestions for future research are made.

Performance

Participants were 11 college students who were regarded as high performers after successfully exceeding the minimum performance criterion by completing more than 750 checks correctly during the introductory session. Performance on the
experimental task during the introductory session ranged from 752 to 1327 checks completed correctly. In addition, each participant spent the entire 45-minute introductory session on task. Thus, it's important to note that while each participant was keyboard proficient, there were individual differences in levels of skill and proficiency.

The majority of participants (9 of 11) performed better during the first individual incentive phase than during the hourly pay phase. Thus, monetary incentives effectively controlled their performance permitting a valid comparison between individual and group incentives for these 9 participants. Seven of these 9 participants also performed better when paid individual and group incentives than when paid hourly.

Two participants (P75 and P82) performed lower during the first individual incentive phase than during the hourly pay phase indicating that the monetary incentives did not effectively control their performance, and thus suggesting that they should not be considered high performers. Even so, they were kept in the study to examine what effects, if any, would result from the interventions. Their performance continued to decrease across the final two phases (C-B). Visual analysis of their session by session data suggest that performance changes correspond with changes in time on task rather than rate of performance. This suggests that even though these participants were proficient in the task other factors influenced their day-to-day performance. Additionally, both participants only narrowly exceeded the proficiency criterion during the introductory session to be included in the study. When questioned
during their debriefing sessions, both participants indicated that too much effort or work was required during the individual incentive phase to earn the same pay as they had during the hourly pay phase. This suggests that verbal behavior (self-stated rules) may have been a factor in influencing their performance under various pay systems. Furthermore, it appears that for these participants the response effort associated with the task was more salient to them than the amount of money they could have earned under the individual incentive phases. Additionally, the order of the different pay system phases may have affected performance.

These results may also be due to the design of the pay systems in the current study, and thus unique to it. In the current study, the individual incentive system was designed so that participants would earn the same amount as they earned in the hourly pay condition if they performed at the average level of individuals who were paid incentives from previous studies. This was done in an attempt to control for the amount of money earned. However, in most real world incentive systems, employees begin earning incentives when their performance exceeds average performance under hourly pay. Thus, the current incentive system did require considerably more effort to earn incentives than is typical in most business settings. Accordingly, results, at least for these 2 participants (P75 and P82), may have been different if the design of the current incentive system had been more similar to those in actual work settings.

Seven of the nine participants whose performance was controlled by the individual incentives decreased their performance during the group incentive phase. The average performance of the two remaining participants (P70 and P80) was
comparable during the first individual incentive phase and the group incentive phase (i.e., less than plus or minus 50 checks), and increased during the final incentive phase. However, it’s important to note that P80’s performance decreased markedly during the final three sessions in the group incentive phase and this resulted in a slight reduction in her average overall performance (25 checks). Thus, her performance was affected during the group incentive phase, but it took multiple sessions for performance to be controlled by the group contingencies. These data (P80’s performance) suggest that some high performers may need to be exposed to group incentives multiple times for performance changes (decreases) to emerge.

Of the seven participants whose performance decreased during the group incentive phase, six increased their performance during the final individual incentive phase. Only the performance of P78 failed to increase when switched to the final individual incentive phase. When questioned during the debriefing session, she reported that she had received a student loan during the group incentive phase and this corresponded with the striking reduction in performance that continued through the end of the study.

The results of the current study indicate that high performers may well perform lower when paid group incentives than when paid individual incentives which, in turn, may decrease overall group performance and therefore organizational performance. These results are similar to those found by Honeywell et al. (2002) and McGee et al. (2005). In the Honeywell et al. (2002) study, which used the same experimental design and feedback conditions as the current study, the majority of
participants (3 of 4) performed lower when paid group incentives than when paid individual incentives. The experimental task utilized in the Honeywell et al. (2002) study differed considerably from the experimental task in the current study, yet the results in both were very similar, thus adding credibility to the replication of results. For a detailed description of the study and results refer to the preceding section, *The effects of group incentives on high performance.*

The results of the current study are also similar to those found by McGee et al. (2005). Statistical analyses from that study revealed that high performers performed lower when paid group incentives than when paid individual incentives after exposure to both pay systems although the decrease in performance was not significant ($p > 0.05$). However, high performers increased their performance significantly when switched from the group incentive phase to the final individual incentive phase ($p < 0.01$). The individual feedback component (which was part of the comparative feedback procedure in the final three phases) may have initially sustained performance during the group incentive phase. However, after exposure to both types of pay systems, performance was significantly higher when participants were switched to the final individual incentive phase.

The two studies differed operationally in two important ways. First, McGee (2004) provided both individual and group feedback, i.e., social comparison feedback, during the individual incentive and group incentive phases. In the current study, participants only received individual feedback with individual incentives and group feedback with group incentives. Secondly, it was possible for participants in
the McGee (2004) study to be on task and off task at the same time. That is, they could converse with other participants who were working in close proximity to them or by cell phone and still perform the computer task. To reduce the likelihood that participants would engage in alternative concurrent activities during the current study, participants worked alone, out of view from and proximity to other participants, and were asked to refrain from using their cell phones during each session.

*Preference, Satisfaction, and Stress*

The majority of participants found the individual incentive pay to be the most preferred (6 of 11) and most satisfying (6 of 11), and the group incentive pay to be the least preferred (7 of 11), least satisfying (9 of 11), and most stressful (7 of 10) of the three pay systems. One participant (P75) commented that there was no difference in stressfulness between the three pay systems and did not rank them on the questionnaire. These results are similar to those reported in three studies (Honeywell et al., 1997; Honeywell-Johnson et al., 2002; McGee, 2004) that examined high performers, and also reported participants' satisfaction with and/or preference for the individual incentive and group incentive systems.

It should be noted that the preference and satisfaction data may reflect the fact that participants earned more money when they were paid individual incentives than when they were paid group incentives or hourly wages. Previous studies have reported that participant preference and satisfaction for different pay systems are influenced by the amount earned (Bucklin & Dickinson, 2001; Dickinson & Gillette, 1993; Honeywell et al., 1997; Honeywell-Johnson et al., 2002). Nonetheless, as
pointed out by Honeywell-Johnson et al. (2002), high performers will always earn more money when they are paid individual incentives than when they are paid group incentives. Thus, for high performers, the amount of pay and type of pay system will always be confounded in work settings. It is likely that high performers in actual organizations will prefer individual incentives, however, their preferences may be related to their higher earnings, rather than to the features of the incentive system.

Implications for Business and Industry

The results of the current study have implications for business and industry. The results suggest that for high performers, group incentives may decrease performance when compared to individual incentives, and as a result decrease overall group performance. In turn, organizational performance may suffer. It should be noted that the extent to which group performance may suffer not only depends upon the effects of group incentives on high performance but also on how they affect average and low performance, both of which have yet to be investigated empirically.

The results also suggest that the introduction and order of pay system administration may affect performance. Recall that in the current study, two participants whose performance did not increase when switched to individual incentives indicated that exposure to the hourly pay system likely affected their subsequent lower performance. Also, participants in the McGee et al. (2005) study were affected by exposure. That is, they only significantly increased their performance under individual incentives after having been exposed to individual and
group pay systems. Thus, organizations must consider employees' history and experience when designing, introducing, and implementing pay systems.

In addition, the majority of high performers found the individual incentive pay to be the most preferred and satisfying of the three pay systems and the group incentive pay to be the least preferred, least satisfying and most stressful of the three pay systems. These data are consistent with those reported in earlier studies (Honeywell et al., 1997; Honeywell-Johnson et al., 2002; Kuhn & Yockey, 2003). Although satisfaction with pay and the pay system is only one facet of overall job satisfaction, if high performers are unhappy with the way they are paid it could influence their overall job satisfaction and increase turnover (Miceli & Mulvey, 2000).

Suggestions for Future Research

The order in which the different pay system phases were implemented and the design of the individual incentive system may have affected performance. For example, two participants, when questioned about their failure to increase their performance when switched from hourly pay to individual incentives, commented that they would have had to exert substantially more effort than was initially acceptable to earn the same amount of pay. Thus, future researchers should consider altering the order of pay system administration and designing the individual incentive system to be more typical of those implemented in actual business settings that require less response effort to earn additional money.
The effects of social contingencies should be investigated. In the current study, participants were told that they were working as part of a ten-person group that they had been assigned to but were given no other information about the group members. When questioned, some participants stated that the implied social contingencies affected their performance. For example, some stated that they continued to perform at high levels because they didn’t want to hinder the group’s performance, others stated that they performed at lower levels because they had no control over their pay, and one participant stated that she could “slack off and let the rest of the group do the work.” In contrast, other participants commented that because they didn’t know the other members in their group, they didn’t care how their performance affected them. Future researchers should investigate the effects that social contingencies have on performance and satisfaction.

Future research should examine the effects of individual and group monetary incentives on the performance and satisfaction of average and low performers. The extent to which group performance may suffer not only depends upon the effects of group incentives on high performance but also on how they affect average and low performance. For example, if average and low performers increase their performance when they are paid group incentives, then even if high performers decrease their performance, overall group performance may not be affected.

Finally, as with all laboratory studies, caution must be exerted when generalizing the results to actual business settings. Replication of this study in an actual work setting is recommended.
Appendix A

Recruitment Script
Recruitment Script

Hello! My name is Kathryn Culig and I am a doctoral student in psychology at Western Michigan University. My area of specialization is organizational behavior management. I am looking for individuals to participate in a study designed to determine how individuals perform a data entry task when they are paid different ways. 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.

Participation will require you to attend a minimum of 20 45-minute sessions and a maximum of 40 sessions, for a total of at least 15 hours, not to exceed 30 hours of your time, over a 7 to 14 week period of time. The amount of money you will be paid will depend upon your performance, but it is likely that you will earn at least $120.00 if you complete the study. You may earn more if your performance on the task is higher than average and if you are asked to attend more than 20 sessions.

Your participation is completely voluntary. If you choose to participate, you may leave the study at any time. If you do leave the study early, you will be paid for your participation up to that point. Your willingness to participate in, or your withdrawal from the study at any time, will in no way affect your grade in this or any other class.

If you would like to learn more about this study and play computer games at least one hour a week, please print your name, phone number or email address on a sheet of paper, whichever is most convenient for you, 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 be contacting you within the next few days to arrange a time that we can meet to discuss the details of the study.

Thank you for your time!
Appendix B

Participant Inclusion Computer Game Use Screening Questionnaire
Instruction: Please answer the following questions. All information will remain confidential.

1. Do you play any of the following computer games?
   Freecell   __ Yes   __ No
   Tetris     __ Yes   __ No
   Solitaire  __ Yes   __ No
   Pinball    __ Yes   __ No
   Minesweeper __ Yes   __ No
   Hearts     __ Yes   __ No
   Spider Solitaire __ Yes   __ No

2. If you play games, how often do you play?
   1 2 3 4 5 6 7 8 9 times a day
   1 2 3 4 5 6 7 days a week
   1 2 3 4 times a month

3. On average, how many hours per week do you play computer games?
   <1 1 2 3 4 5 6 7 8 9 10+ hours per week

4. Do you know anyone that has signed up to participate in the study? Please list their names.

5. If you know anyone that might be interested in signing up for the study, please refer him or her to Kathryn Culig 383-1171.
Appendix C

Participant Inclusion Pay System Quiz
Pay Condition Quiz

HOURLY PAY SYSTEM:
Individuals are paid $5.75 for a 45-minute session.

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

GROUP INCENTIVE PAY SYSTEM:
Individuals are paid $.006 for every check correctly processed during the session, determined by the group’s average number of correctly processed checks.

Answer the following questions based on the above pay systems.

1. Jane correctly processed 1200 checks during a session. Jane’s group correctly processed 1000 checks.
   A. What amount would Jane earn under the GROUP INCENTIVE pay system?
   B. What amount would Jane earn under the INDIVIDUAL INCENTIVE pay system?
   C. What amount would Jane earn under the HOURLY pay system?

2. Ed correctly processed 950 checks during a session. Ed’s group correctly processed 1200 checks.
   A. What amount would Ed earn under the GROUP INCENTIVE pay system?
   B. What amount would Ed earn under the INDIVIDUAL INCENTIVE pay system?
   C. What amount would Ed earn under the HOURLY pay system?

3. Mary correctly processed 750 checks during a session. Mary’s group correctly processed 700 checks.
   A. What amount would Mary earn under the GROUP INCENTIVE pay system?
   B. What amount would Mary earn under the INDIVIDUAL INCENTIVE pay system?
   C. What amount would Mary earn under the HOURLY pay system?
Appendix D

Consent Document
I have been invited to participate in a research study intended to investigate the effects of different types of pay on work performance. This project is Kathryn Culig's dissertation project. Dr. Dickinson is her advisor.

Participation requirements. During today’s introductory session, my eligibility to participate in this study will be determined. First, I must indicate that I spend a certain amount of time using computer games and that I am available to attend scheduled sessions. Second, the experimenter will explain the ways I will be paid during the study. After that explanation, I must pass a quiz that tests my understanding of the ways I will be paid. Additionally, participants in the study need to perform at certain levels on the data entry task. My performance on the data entry task will be assessed during today's session. If I perform at a certain level and meet the other eligibility requirements, I will be invited to participate. If not, I will be paid $5.75 for attending the session, but will not be invited to participate in the study.

Explanation of study procedures and length of participation. I will perform a computerized data entry task. Simulated bank checks will be displayed on the computer screen and I will type the amounts of the checks using the computer keyboard. Each session will be 45 minutes and I will be asked to attend at least 20 sessions. Thus, my total time commitment will be at least 15 hours. I may be asked to attend up to 40 sessions, for a total of 30 hours. I will be asked to schedule at least three sessions per week, thus I will be involved in the study for 7 to 14 weeks. The total number of sessions I will attend will depend upon my performance. I will be able to take a break and engage in other activities (i.e., computer games) at any time during my scheduled sessions.

Compensation. I will receive monetary compensation for my participation in the study. I will receive $5.75 immediately following today's introductory session. During the study, I will be paid three different ways. In some sessions, I will be paid $5.75 per session as long as I correctly process a minimum of 490 checks. In other sessions, the amount of money I will earn will depend upon how many checks I correctly process. In other sessions, the total amount of money I earn will depend on the average number of correctly processed checks completed by the group to which I am assigned. I will be paid in cash.
once a week. The total amount of money I will earn will depend upon my performance and the performance of my group, but it is likely that I will earn at least $120.00 if I complete the study. I may earn more if my performance on the task is higher than average and if Dr. Dickinson and Kathryn Culig ask me to attend more than 20 sessions. The more sessions I attend, the more money I will make.

Benefits. The only benefit I will receive for participating in this study will be the amount of money I earn. The data obtained from this study will help determine how different pay systems affect the performance of individuals. This knowledge may allow businesses to design better pay systems.

Risks. The amount of time it will take to participate in this study may make it inconvenient. I may experience physical discomfort associated with the data entry task. This will be offset by the fact that the computer workstations have been set up in accordance with accepted ergonomic standards provided by the Occupational Safety and Health Administration. In addition, I may take work breaks whenever I want and will be prompted by the experimenter to take a break during the session. During the 45-minute sessions, I may also encounter fatigue or mild stress while performing the task. This will be offset by the fact that I can take breaks and/or engage in alternative activities whenever I want. Because of past experience with the type of task that will be used in this study, individuals perform differently on it. My performance may be different than the performance of others and this may be stressful to me as well.

Confidentiality. All information obtained in this study will remain strictly confidential. When results of the study are presented publicly, I will not be identified. I will be assigned a number and that number will be used to identify my data. By signing this consent document I am giving permission for data obtained in this study to be presented in professional presentations and publications.

Voluntary participation. My participation in this study is entirely voluntary. I may withdraw from the study at any time without penalty. If I do withdraw, I will receive the amount of money that I have earned up to that point. My participation in the study, or my withdrawal from the study, will not affect my grades in any of my courses. At the end of the study, the experimenter will answer any questions I have and explain how my data will help to learn more about pay systems.

Who to contact with questions. If I have any questions concerning this study I may call Kathryn Culig at (269) 383-1171. In addition, Dr. Dickinson, the faculty advisor for the study, can be reached at 387-4473. I may also contact the Chair, Human Subjects
Institutional Review Board (387-8293), or the Vice President for Research, at 387-8298, if questions or problems arise during the course of the study.

This consent document has been approved for use for one year by the Human Subjects Institutional Review Board as indicated by the stamped date and signature of the board chair in the upper right corner. Participants should not sign this document if the corner does not have a stamped date and signature.

My signature below indicates that I understand the above information and agree to participate in the study.

Participant Signature: ___________________________ Date: ____________

Consent Obtained By: ___________________________ Date: ____________
Initials of researcher

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

Computer-Based Task Sample Screen
Enter the amount in the check seen above:

Enter only numbers and decimal (example 150.77)
Appendix F
Data Recording Form
### Data Recording Form

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<th>C2</th>
<th>C3</th>
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<tr>
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<td>Condition</td>
<td>Date</td>
<td>Session</td>
<td>Time off Task (s/60=min)</td>
<td>Time on Task (45-C4)</td>
<td>Total # Checks Complete</td>
<td># Checks Correct</td>
<td>% Correct (C7/C6)</td>
<td>Rate (C7/C5)</td>
<td>Amount Earned</td>
</tr>
</tbody>
</table>
Appendix G

Preference, Satisfaction, and Stress Level Questionnaire
Preference, Satisfaction and Stress Questionnaire

Instructions: Please answer the following questions.

1. Originally, what did you believe to be the purpose of the study?

2. Now, what do you believe is the purpose of the study?

3. If your answers to 1 & 2 are different, when did you change your belief?
   - □ During the Hourly pay condition
   - □ During the first Individual Incentive pay condition
   - □ During the Group Incentive pay condition
   - □ During the second Individual Incentive pay condition

4. Rank order the hourly pay, the individual incentive pay and the group incentive pay in terms of how much you preferred them. Start with the one you preferred the most.
   - Most preferred: 1. ________________________
   - 2. ________________________
   - Least preferred: 3. ________________________

5. Please explain why you ranked them as you did:

6. Rank order the hourly pay, the individual incentive pay and the group incentive pay in terms of how stressful they were. Start with the one that was most stressful.
   - Most stressful: 1. ________________________
   - 2. ________________________
   - Least stressful: 3. ________________________

7. Please explain why you ranked them as you did:

8. Rank order the hourly pay, the individual incentive pay and the group incentive pay in terms of how satisfied you were with them. Start with the one that was most satisfying.
   - Most satisfying: 1. ________________________
   - 2. ________________________
   - Least satisfying: 3. ________________________

9. Please explain why you ranked them as you did:
10. How many other people participated in your incentive group during the Group Incentive condition? _______ How do you know that?

11. Other comments?
Appendix H

Payment Receipt for the Hourly Pay Condition
SESSION RECEIPT

Session Date: ____________________________

Number of Checks Completed Correctly: ______

Hourly Pay: $5.75 for over 300 checks

Amount Earned: ____________________________
Appendix I

Script for Pay System Description/Feedback/Alternative Activities
Description of Pay Systems Script

Before the session begins, tell the participant what pay condition is in effect and read the following description for that pay condition:

HOURLY PAY CONDITION: Today you will be working in the hourly pay condition. You will be paid $5.75 for the session, provided you correctly process a minimum of 300 checks.

INDIVIDUAL INCENTIVE CONDITION: Today you will be working in the individual monetary incentive condition. You will be paid based on number of checks you correctly process during this session. For every check you correctly process, you will be paid $.006.

GROUP INCENTIVE CONDITION: Today you will be working in the group monetary incentive condition. You will be paid based on the average number of checks correctly processed by the group of 10 to which you are assigned. For every check in the group average, you will be paid $.006.

Feedback Script

Before the session begins, give the subject his/her receipt for the last session and read the following (do not read the part in parentheses during the hourly pay condition):

During your last session, the _______ pay condition was in effect. You correctly processed ________ checks. (The group correctly processed ________ checks.) Therefore, the amount of money you earned for that session is ________.

If it is the first session of the week, or the first session of a new phase, tell the participant the total pay earned during the past week and pay the participant.

Alternative Task Script

As in previous sessions, you may take work breaks whenever you like. Computer games are available on the computer. Once during the session, I will remind you that you may want to take a break.
Appendix J

Payment Receipt for the Individual Incentive Pay Condition

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SESSION RECEIPT

Session Date: ________________________________

Number of Checks Completed Correctly: __________

Individual Incentive Pay: $0.006 per check completed

Amount Earned: ________________________________
Appendix K

Payment Receipt for the Group Incentive Pay Condition
SESSION RECEIPT

Session Date: ________________________________

Average Number of Checks Completed Correctly by Group: __________

Group Incentive Pay: $0.006 per check completed in group average

Amount Earned: ________________________________
Appendix L

Pay Scale
# Pay Scale
($0.006/check)

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Appendix M

Debriefing Script
Debriefing Script

Following the last session of participation:

1. Thank the subject for participating in the research study.

2. Explain the purpose of the study as follows:

   A. Previous research has demonstrated that when people are paid individual or group monetary incentives, they perform better than when they are paid hourly rates.

   B. Studies that have compared performance under individual and group monetary incentives have had mixed results. For example, some studies have found no differences in performance when individuals have been exposed to both group and individual monetary incentives. Other studies have found that performance is lower when individuals are paid group incentives than when they are paid individual incentives.

   C. One reason for these conflicting results may be that, in some of the studies, the performance of the group was relatively equal to the performance of the individual (in this situation, the money earned by the individual would have been the same under both incentive systems). However, in other studies, the performance of the group may have been lower than the performance of the individual (in this situation, the individual would have earned less when paid group monetary incentives than when paid individual monetary incentives).

   D. Recent research supports the idea that high performance may decrease when individuals are paid group monetary incentives.

   E. The purpose of this study is to determine if high performance decreases when individuals are paid group incentives as compared to performance when individuals are paid individual incentives.

   F. If high performance decreases when individuals are paid group incentives, organizations may want to consider implementing an individual monetary incentive system instead of a group monetary incentive system to keep performance levels up.

   G. Ask if they understand this, and/or if they have additional questions.
3. Explain the four phases of the study as follows:

A. Phase 1 was an hourly pay condition in which you were paid $5.75 per session, as long as you correctly completed 300 checks. In work settings, employees must perform at minimum levels to avoid supervisory criticism and being fired. This minimum requirement was designed to simulate that contingency.

B. Phase 2 was an individual monetary incentive condition. In this phase, you were paid based on how many checks you correctly processed in each session. You were given individual feedback during this phase.

C. Phase 3 was a group monetary incentive condition. In this phase you were paid based on how many checks the simulated group correctly processed. However, there wasn’t actually a group and the average performance of the group was contrived to be 25% lower than your performance.

D. Phase 4 was a reversal to individual monetary incentives with individual feedback.

E. Ask if they understand this, and/or have additional questions.

4. Show the participant graphs of his/her performance (scores, time on task, accuracy). Ask if the participant has questions about the graphs.

5. Explain how the participant’s performance relates to the research question (e.g., did the participant’s performance increase, decrease or remain the same throughout the group incentive condition).

Ask the subject if s/he has questions regarding participation. Answer those questions.
Appendix N

Research Protocol Approval
Date: February 25, 2004

To: Alyce Dickinson, Principal Investigator
Kathryn Culig, Student Investigator

From: Mary Lagerwey, Ph.D., Chair

Re: HSIRB Project Number: 04-02-11

This letter will serve as confirmation that your research project entitled "The Effects of Individual Monetary Incentives with Individual Feedback and Group Monetary Incentives with Group Feedback on High Performance" has been approved under the expedited category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note 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: February 25, 2005
Date: August 9, 2004

To: Alyce Dickinson, Principal Investigator  
   Kathryn Culig, Student Investigator

From: Amy Naugle, Interim Chair

Re: HSIRB Project Number: 04-02-11

This letter will serve as confirmation that the changes to your research project "The Effects of Individual Monetary Incentives with Individual Feedback and Group Monetary Incentives with Group Feedback" requested in your memo dated August 3, 2004 have been approved by the Human Subjects Institutional Review Board.

The conditions and the duration of this approval are specified in the Policies of Western Michigan University.

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: February 25, 2005
Bibliography


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Milkovich, G. T., & Stevens, J. (2000). From pay to rewards: 100 years of change. ACA Journal, 9, 6-17.


