# DIFFERENT EFFECTS OF INDIVIDUAL AND SMALL GROUP MONETARY INCENTIVES ON HIGH PERFORMANCE

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## Abstract

The effects of individual and small group monetary incentives on the performance and satisfaction of high performers were examined. The design was an ABCB within-subject reversal design, where A = hourly pay, B = individual incentives and C = group incentives. Four college students were told that they were members of a10-person group. During the group monetary incentive condition, the simulated group's performance was manipulated so that the participants were "high" performers. Participants performed four simultaneous computerized tasks, an arithmetic task, a memory task, a visual monitoring task and an auditory monitoring task, earning points for correct responding. Three of the four participants performed an average of 16%, 14%and 12% lower when paid group incentives than when paid individual incentives. All four preferred individual incentives to group incentives and hourly pay, and three of the four reported that group incentives were more stressful than either hourly pay or individual incentives.

Laboratory and field studies have consistently demonstrated that individual monetary incentives and small group monetary incentives increase performance in comparison to hourly pay (for recent reviews, see Bucklin & Dickinson, in press; Honeywell-Johnson &Dickinson, 1999; Jenkins, Gupta, Mitra, & Shaw, 1998). Given the relevance of compensation systems to business organizations, most of this research has been conducted within that context. The results of these studies, however, have implications for other settings and, perhaps, for rewards other than money (Hantula, 2001). No doubt this is because individual and group monetary incentives have many of the same characteristics that have been identified by behavior analysts as features of any type of effective management reward system (Braksick, 2000; Brown, 1982; Daniels, 1989; O'Brien & Dickinson, 1982). They: (a) are based on the performance of the individual or the performance of only a small number of individuals; (b) are based on clearly specified behaviors or outputs; (c) are certain (that is, if the behavior/output occurs, the individual will receive the incentives); and (d) are paid as soon after the performance as possible as part of the individual's paycheck. Nonetheless, the current discussion will be restricted to the examination of the effects of individual and group monetary incentive systems within the field of organizational behavior.

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Surveys conducted over the past decade have consistently reported that about 35% of U.S. companies pay their employees individual monetary incentives and about 15%-20% pay their employees small group monetary incentives (Gross, 1995; Lawler, Ledford, & Mohrman, 1989; Mitchell, Lewin, & Lawler, 1990;O'Dell & McAdams, 1987; Peck, 1990). While individual monetary incentive systems are currently more prevalent in business and industry, the use of small group incentives is increasing. In one survey, 39% of the respondents who did not use group incentives reported that they were considering them (Gross, 1995). Based on the results of another survey,

Ledford and Hawk (2000) reported that the use of small group monetary incentives in Fortune 1000 firms increased by 50% between1987 and 1996. This increase reflects the fact that many organizations have adopted group pay plans to support new organizational structures based on work teams (Flannery, Hofrichter, & Platten, 1996).

When individuals are paid individual monetary incentives, the incentives are based solely on the performance of the individual employee. In contrast, when individuals are paid group incentives, the incentives are based on the total performance of the group. Because workers have less control over the group's performance and hence their individual earnings, they may be less productive than when they are paid individual incentives (Blinder, 1990; Dierks & McNally, 1987; Honeywell, Dickinson, &Poling, 1997; McCoy, 1992). On the other hand, 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 monetary incentives as when they receive individual monetary incentives (Honeywell-Johnson & Dickinson, 1999; Honeywell et al., 1997).

**Table 1: Studies That Have Compared Individual and Equally-Divided Small Group Monetary Incentives**

| Authors | Participants | Performance Measure | Experimental Design | Results |
|---|---|---|---|---|
| Allison et al. (1992) | Teaching assistants, disabled children 1 group of 12 | Tasks completed | Within subject, reversal | Higher with group incentives $p < .03$ |
| Farr (1976) | College students 48 groups of 3 | Cards sorted | Between group | No difference $p > .05$ |
| Honeywell et al. (1997) | College students 2 groups of 10 | Cards sorted | Within subject, alternating treatment | No difference $p > .05$ |
| Stoneman & Dickinson (1989) | College students 5 groups of2 1 group of 4 1 group of 5 1 group of 9 | Parts assembled | Within subject, reversal | No difference Visual analysis |
| Thurkow et al. (2000) | Telephone interviewers 6 participants with group size varying; average group size was 7, ranging from 2-24 | Surveys completed per hour | Within subject, multi-element | Higher with individual incentives Visual analysis |

Somewhat surprisingly, given the prevalence of small group monetary incentives in business and industry, only five experimental studies (as opposed to survey studies) have compared the effects of individual and small

group incentives on performance (Allison, Silverstein, & Galante, 1992; Farr, 1976;Honeywell et al., 1997; Stoneman & Dickinson, 1989; Thurkow, Bailey, &Stamper, 2000). In business and industry, the median number of members in a work team is 10 (Peck, 1990); in the preceding studies, the size of the groups ranged from 2-12 members[7]. The general features of these studies and a summary of their results are presented in Table 1.

All five studies examined equally-divided small group monetary incentives, the most common type of group monetary incentive system, while two (Allison et al., 1992; Farr, 1976) also examined the effects of differentially-divided group incentives. With equally-divided incentives, the performance of the group members is pooled, and the incentives earned by the group are divided equally among group members. With differentially-divided incentives, the performance of the group is also pooled, but the incentives earned by each member of the group are based on the individual's contribution to the group's productivity. For example, in Farr's (1976) three-person groups, the top performer received 50% of the available incentives, the middle performer received 33%, and the bottom performer received 17%. Due to the fact that only two studies have compared the effects of individual incentives and differentially-divided group incentives and the results were conflicting, this comparison will not be discussed further here. Readers who are interested in a detailed description and analysis of the results of these comparisons are instead referred to Honeywell-Johnson and Dickinson (1999).

In three of the five studies, individuals performed comparably when paid individual and group incentives (Farr, 1976; Honeywell et al., 1977; Stoneman & Dickinson,1989); in one, individuals performed better when they were paid group incentives (Allison et al., 1992); and in one, individuals performed better when they were paid individual incentives (Thurkow et al.,2000). Thus, in four of the five studies, individuals performed as well or better when they were paid equally-divided small group incentives as when they were paid individual incentives.

Honeywell-Johnson and Dickinson (1999) proposed that when individuals perform the same when paid individual and group monetary incentives it may be due to the fact that individuals within the group perform similarly to one another. If individuals within the group perform similarly to one another, the amount of pay they receive when they earn individual and group incentives does not vary much. If pay does not vary, then one would not expect performance to vary. Rather, individuals are most likely to change their performance if they are relatively high performers and see their earnings decrease over time due to the lower performance of others. In this situation, they would be likely to decrease their performance (Dierks &McNally, 1987). This, in turn, would decrease the group's total performance.

The individual performance data necessary to determine whether members of the group performed similarly to one another were reported in three of the five studies that were conducted (Honeywell et al., 1997; Stoneman & Dickinson,1989; Thurkow et al., 2000). Only group data were reported in the other two (Allison et al., 1992; Farr, 1976). In the studies that reported individual data, the data support the proposition made by Honeywell-Johnson and Dickinson (1999). In Honeywell et al. (1997) and Stoneman and Dickinson (1989), members of the groups performed similarly to one another when paid individual incentives and also performed similarly when paid individual and group monetary incentives. As indicated above, in Thurkow et al. (2000) workers performed better when they were paid individual incentives than when they were paid group incentives. Although there are several reasons why Thurkow et al.'s(2000) results may have differed

1. [7] In Thurkow et al. (2000), the results were based on the performance of six participants; however, the participants were part of groups that varied in size from day-to-day depending upon how many other employees were scheduled to work. The average size of the work group was seven, but ranged from two to twenty-four members.

from the results of the other four studies(i.e., lack of a clear group goal during the group incentive condition, the day-to-day changes in the group size, and the changing membership of the group), Thurkow et al.'s six participants performed better than the other members in their groups in 67% of the sessions. Hence, it is possible, as suggested by Dierks and McNally(1987) and Honeywell-Johnson and Dickinson (1999), that they decreased their performance during the group incentive condition because they earned less money due to the performance of the other members of the group.

Results from London and Oldham (1977)and Honeywell et al. (1997) provide the strongest support for the proposition made by Dierks and McNally (1987) and Honeywell-Johnson and Dickinson (1999). Using a between-group experimental design, London and Oldham compared the effectiveness of fixed-rate pay, individual monetary incentives and three different small group monetary incentive systems, one of which was equally-divided group incentives. After each participant had been exposed to individual monetary incentives for one session but before they were exposed to one of the five pay systems for an additional three sessions, one-half of the participants were told that they were high performers while one-half were told that they were low performers. Due to the unique nature of this intervention, this study was not discussed earlier or included in Table 1. Seven two-person groups were assigned to each of the five experimental pay conditions (fixed-rate pay, individual monetary incentives or one of three different small group monetary incentive systems). The two group members were introduced to each other and then separated to work indifferent rooms. The experimental task consisted of sorting cards punched with holes into separate piles based on the pattern of the holes punched in the cards. Participants were first exposed to an individual monetary incentive condition for one 5-minute session, during which they were paid $.01 for each card they sorted. After participants were paid for this trial, one of the group members was told that he or she sorted 25% more cards than his or her partner, while the other was told that he or she sorted 25% fewer cards than his or her partner. Participants were then exposed to one of the five pay conditions for three 5-minute sessions. Only the results for participants who were exposed to the equally-divided group incentives based on their average performance will be reported here due to the fact that the other results are not relevant to the current discussion. Readers who are interested in a detailed analysis of all of the results are referred to the original study or to Honeywell-Johnson and Dickinson (1999). 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, *SD*s not reported). Participants who were told that they were high performers, however, sorted 16% fewer cards when they were paid equally-divided group incentives than when they were paid individual incentives (average = 58.2cards versus 69.6, *SD*s not reported). Statistical analyses were not conducted for these within-subject comparisons, nor were the results of between-group analyses reported for individual incentives and equally-divided group incentives. Thus, while these results support the contention that high performers may perform lower when they are paid group incentives than when they are paid individual incentives, they cannot be considered conclusive.

Honeywell et al. (1997) compared the effects of individual and equally-divided small group monetary incentives on the performance of individuals who were members of 10-person groups. Two groups were included in the study. The experimental task was a card sorting task, similar to the one used by London and Oldham (1977). An alternating treatment design was employed. Individual and group incentives were alternated during successive 20-minute sessions for 14 sessions, seven of which were conducted on one day and seven of which were conducted on the following day. As indicated previously, performance did not differ under individual and group monetary incentives. Because there were a few distinct high performers in the groups, these results appear to contradict the proposition made by Dierks and McNally (1987) and Honeywell-

Johnson and Dickinson (1999). A detailed analysis of the results, however, supports their position. When Honeywell et al. statistically analyzed their data, they collapsed the data across the two groups of participants. When the data for the two groups were analyzed separately, performance was statistically significantly lower during the group incentive conditions than during the individual incentive conditions for one of the groups (Honeywell, 1995). This group contained the highest performers. A visual inspection of their data revealed that these participants performed lower during the group incentive condition than during the individual incentive condition, prompting Honeywell to state that the results warranted further study.

When individuals are exposed to different types of pay systems, their preference for a particular pay system is correlated with the amount of money earned (for reviews, see Bucklin & Dickinson, in press; Dickinson & Gillette,1993); thus, because high performers earn more money when they are paid individual incentives than when they are paid group incentives and low performers earn more money when they are paid group incentives than when they are paid individual incentives, one would expect high performers to prefer individual incentives and low performers to prefer group incentives. Unfortunately, the data are sparse because only one study (Honeywell et al., 1997) reported the individual data that are necessary to identify high and low performers and also assessed employee preference. In that study, point-biserial correlations between performance and choice of incentive system, revealed that, indeed, high performers preferred individual incentives and low performers preferred group incentives.

The purpose of the present study was to compare the effects of individual and small group monetary incentives on the performance and satisfaction of high performers. Simulated, rather than co-acting groups were used. That is, the four participants were told that they were members of a 10-person group, when, in fact, they were not. Participants worked on networked computers and were told that their data would be combined with the data from nine other "group" members. 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;Hollingshead, McGrath, & O'Connor, 1993; Mullen, Johnson, & Anthony, 1994;Weaver, Bowers, Salas, & Cannon-Bowers, 1995). When group members make individual contributions to the pooled performance of the group (as opposed to tasks that require extensive interaction and negotiation), the results from simulated-group studies have been consistent with the results from co-acting group studies (e.g., Hollingshead et al., 1993; London & Oldham, 1977; Mullen et al., 1994). The results of Mullen et al. (1994) are of particular relevance to the current study. In that study, participants who believed that their sub-group constituted 75% of the total group and those who believed that their sub-group constituted only 25% of the total group responded differently on a classification task. These results indicate that group size can be successfully manipulated in a computerized simulation.

## METHOD

### Participants

Participants were four undergraduate students recruited from psychology classes and student employment services at a large Midwestern university. Participants were included if they passed (a) a quiz containing arithmetic problems that were identical to the ones in the experimental task and (b) a quiz that tested their understanding of the three pay systems that served as the independent variables. The arithmetic quiz consisted of 20 addition problems. Participants were required to solve 90% of the problems correctly, with only one remediation. To pass the pay condition quiz, participants had to correctly answer six questions about the pay conditions, with only one remediation. Participants received hourly pay, individual monetary incentive pay and group monetary incentive pay as detailed in the Independent Variable section. They were also

given $10.00 for completing the study and attending a final session during which they completed a post-experimental questionnaire. All participants signed an informed consent form that was approved by the university's Human Subjects Institutional Review Board.

**Setting**

The study was conducted in a university computer laboratory containing 15 Pentium computers connected through a Local Area Network. Each participant had a work area consisting of a computer with a keyboard, mouse and headphones. An adjacent computer provided access to alternative activities (computer games, email access, and internet access). Participants could engage in these break activities at any time during the sessions.

**Experimental Task**

The task was a computerized synthetic work task called SYNWORK (Elsmore, 1994). SYNWORK has two features that are similar to many jobs in actual work settings: concurrent tasks and measurable outcomes for completion of those tasks. In addition, the four sub-tasks were selected for this program because they require simultaneous attention to tasks that are similar to those required for many jobs (Elsmore, 1994). Each of the four sub-tasks, a memory task, an arithmetic task, a visual monitoring task, and an auditory monitoring task was presented in one of the four quadrants of the computer screen. Participants earned points for correct responses and lost points for incorrect responses. Points were not deducted for non-responding because that would have penalized off-task activities. The points earned on the sub-tasks were added together to obtain a cumulative point total.

In the memory sub-task, presented in the upper left quadrant of the computer, a list of six letters was displayed on the screen for 5 s. Twenty seconds later, a sample letter appeared and remained on the screen for 10 s. Participants could click on a "Retrieve List" box to review the set of letters, but each retrieval resulted in a loss of 10 points. Participants indicated whether the sample letter was part of the original list of letters by clicking on the word "Yes" or "No." Participants earned 10 points for correct responses and lost10 points for incorrect responses.

In the arithmetic sub-task, presented in the upper right quadrant, an addition problem consisting of two 3-digit numbers was presented. An answer of "0000" was displayed below the problem. Two boxes, one containing a "+"and one containing a "-" were located directly below each zero. Participants clicked the "+" box to increase the answer digit by one and clicked the "-" box to decrease the answer digit by one. When participants solved the problem, they clicked the "Done" box and a new problem was presented. Participants earned 5 points for correct answers and lost 5 points for incorrect answers.

A visual monitoring task was in the lower left quadrant. A line, 201 pixels in length, was displayed on the screen. A pointer, initially positioned at the center of the line, moved to the left or to the right at 200 msec per pixel. Participants clicked on a box labeled "Reset" to move the pointer back to the center of the line. The number of points awarded for resetting the pointer was proportional to how close the pointer was to either end of the line. Participants earned 10 points for resetting the pointer when it was at the distant 10 percent of either end of the line but did not earn any points for resetting the pointer if it was at the center. Participants earned a variable number of points (between 1 and 10) for resetting the pointer when it was at other points along the line.

In the auditory monitoring task, presented in the lower right quadrant, a brief tone was presented every 5 s through the headphones. The tone was either a high frequency (1319 Hz) tone or a low frequency (1046 Hz) tone. High frequency tones were "signals" while low frequency tones were "nonsignals." To earn points, participants clicked on a box labeled "High Sound Report" after the presentation of a high frequency tone. They had to click on the box before the presentation of the next tone or they did not earn

any points. Participants earned 10 points for correctly identifying a high tone and lost 10 points for clicking the "High Sound Report" after a low tone.

**Alternative Activities**

In the absence of alternative activities, participants would be likely to perform the experimental task for the entire 2-hr session regardless of what pay condition was in effect. Because monetary incentives have been shown to increase the amount of time individuals spend working in comparison to hourly pay (Matthews & Dickinson, 2000; Pritchard, Hollenbeck, & DeLeo, 1980), the effects of the three different pay systems on performance might be masked if SYNWORK was the only task available. To prevent that possibility, alternative activities were made available to participants on an adjacent computer. The alternative activities consisted of computer games, access to email and access to the internet. These particular alternative activities are available in work settings, and surveys have reported that employees spend time (sometimes considerable time) engaging in them (Betts, 1995; Eng & Schwartz, 1993; Klett, 1994); thus the presence of these particular activities also increased the realism of the simulation.

Participants could perform the alternative tasks whenever they wanted for as long as they wanted during the 2-hr sessions. In addition, the experimenter prompted the participants to take three 5-minwork-breaks during the session.

**Dependent Variables**

The primary dependent variables were: (a) the total number of points earned on the four sub-tasks, (b) the number of points earned on each sub-task and(c) the percentage of correct responses on each sub-task. The computer automatically recorded these data. Secondary dependent variables consisted of participant reaction data. On a post-experimental questionnaire, participants rank-ordered the three pay conditions in terms of preference, satisfaction and evocation of stress.

**Independent Variable**

The independent variable was the type of pay system: hourly pay, individual incentive pay and small group (N=10) incentive pay. The participants worked alone under all pay systems, but during the group pay condition they were told that their point score was combined with the point scores from nine other individuals and that their pay was based on the average performance of the ten individuals in the group.

In the hourly pay condition, participants earned $10.00 for each 2-hrsession, regardless of how many points they earned. The total number of points they earned was displayed on the computer screen at the end of each session. During the individual incentive pay condition, participants earned $.10 for every 100 points earned. If participants performed at the estimated average level (10,400 points), they would earn approximately $10.40 per session, similar to what they would earn when paid hourly. This estimate was based on the performance of pilot subjects who were paid *hourly* when performing SYNWORK. As in the hourly pay condition, the total number of points participants earned was displayed on the computer screen at the end of each session.

During the group incentive condition, the pay earned by each participant was based on the average performance of the members of the simulated group. Similar to the individual incentive condition, participants received $.10 per 100 points in the group average. Thus, participants earned $10.40 per session if members of the group averaged 10,400 points per session. The performance average of the simulated group was calculated in a way that made it likely that participants would be high performers. Each of the nine *simulated members* of the group was assigned a point score of11,400 points for each session. This score was 1.5 standard deviations below the average performance of pilot subjects who were paid *individual incentives* when performing SYNWORK. Thus, even if participants performed at the estimated average level, their point score would be higher than the point scores of the other "members" of their group.

The following formula was used to determine the average performance of the group members: [((11,400 points X 9simulated members) + Participant's point score for the session)/10]. Unlike the other two conditions, to better simulate an actual work setting, the computer did not display the participant's individual point score at the end of the session. Rather, the average performance of the members of the group was displayed. During the first individual incentive phase, all of the participants earned considerably more points than 11,400per session, thus this manipulation was successful; that is, they were high performers in comparison to the other members of the simulated group.

After each session in every pay condition, participants received a receipt indicating their point score or, in the group incentive condition, the average point score for the members of the group, and the amount of money they earned during the session. Participants were paid after their last session of the week or after the last session in an experimental phase.

**Experimental Design and Procedures**

A within-subject reversal design was used in which participants were exposed to each of the pay conditions in an ABCB sequence, with A = hourly pay, B = individual incentive pay, and C = group incentive pay. Experimental sessions were 2hours. Participants were exposed to each pay condition for a minimum of five sessions. If performance was not stable, the phase was continued until performance stabilized or until participants completed 10sessions. The 10-session maximum was imposed because of economic and time constraints. Performance was considered stable if, during three sessions, the participant's point scores varied by no more than plus or minus 1,000 points from the mean of those three sessions (1,000 points was .5 standard deviation from the mean performance of pilot subjects when they were paid hourly). The performance of each participant reached stability for every phase, with one exception: Participant 2, Phase 3 (group monetary incentive pay phase). The point scores for this participant showed a sharp decreasing trend during the last four sessions of this phase. This trend was immediately reversed when Phase 4 was implemented (the individual monetary incentive pay phase); hence, the lack of stability does not confound the interpretation of the data.

Before the study began, each participant attended two 2-hr training sessions. Participants performed SYNWORK and the alternative activities that were on the adjacent computer. The experimenter demonstrated the tasks, remained in the room with the participants, and answered any questions. The training sessions were designed to enable participants to become proficient with SYNWORK. According to Elsmore (1994), "In most studies, six 15-minsessions are sufficient to achieve near-maximal performance [on SYNWORK]" (p. 423).

Before each session, the experimenter reminded the participants of the pay system in effect and described its features. The experimenter also reminded participants that they could take work breaks whenever they wanted for as long as they wanted and told them that computer games, access to email and access to the internet were available on the adjacent computer. The experimenter also told them that they could leave the laboratory if they wished to do so, pointing out that bathrooms, vending machines, and pay phones were near by. The experimenter either left the room during the session or remained in the front of the room facing away from the participants, engaging in a task[8]. In either case, the experimenter made it clear that she was not monitoring the performance of the participants. This was done to reduce the possibility that participants would continue to perform SYNWORK instead of the off-task activities because of potential disapproval from the experimenter. In actual work settings, employees can engage in off-task

2. [8] Initially, the experimenter left the computer laboratory during the sessions. However, there were two doors to the computer laboratory, and college students with keys to the laboratory often entered the laboratory, ignoring their observation schedule. To prevent the disruption of the session, the experimenter thus stayed in the room and, when intruders entered, quietly escorted them out.

activities without observation by the supervisor; hence, this procedure was intended to recreate that type of situation. In addition, three times during the session, the experimenter asked participants if they wanted to take a work break. The computer automatically terminated the session after 2 hours.

## RESULTS

Figure 1 displays: (a) the total number of points earned by each participant for each phase; (b) the average total number points earned per phase; and (c) the standard deviations for each phase. All participants increased their point scores when switched from hourly pay (Phase 1) to individual monetary incentive pay (Phase 2). Average increases were 1,010 points (Participant 4), 1,143points (Participant 1), 2,347 points (Participant 3) and 3,047 points(Participant 2). In addition, the variability of performance decreased considerably for each participant as indicated by the changes in the standard deviations. These data indicate that the performance of each participant was controlled by monetary incentives, which is necessary to demonstrate before the effects of different types of monetary incentive pay can be validly compared.

Three of the participants (Participants 1, 2and 4) earned considerably more points during both individual monetary incentive phases than during the group monetary incentive phase, although in each case, performance was lower during the second individual monetary incentive phase (Phase 4) than during the first individual monetary incentive phase (Phase 2). When performance is averaged across the individual monetary incentive phases and compared to the average performance during the group monetary incentive phase, the data indicate that these participants performed an average of 16%(Participant 2), 14% (Participant 1) and 12% (Participant 4) lower during the group incentive phase than during the individual monetary incentive phases. Average differences were 2,210 points (Individual incentive mean = 13,070, Group incentive mean = 10,860), 1,791 points (Individual incentive mean = 12,885, Group incentive mean = 11,094), and1,492 points (Individual incentive mean = 12,939, Group incentive mean =11,447) for Participants 2, 1 and 4, respectively. Participant 3, the exception, increased her performance across all phases of the study.

The above data indicate that group monetary incentives decreased the performance of three of the four high performers in the study. Interestingly, the performance of these three participants was higher when they were paid hourly wages than when they were paid group monetary incentives. These results conflict with the results of prior studies (e.g., Allison et al., 1992; Farr, 1976). These current results, however, might well have been influenced by the fact that the participants were exposed to individual monetary incentives before they were exposed to group monetary incentives.

Figure 2 displays the number of points earned by each participant on each of the four sub-tasks. For all four participants, point scores for the memory task, the visual monitoring task and the auditory monitoring task remained relatively constant across all experimental phases. Differences in the total number of points earned across phases were due to differences in the performance of the arithmetic sub-task. This is probably due to the fact that participants had more control over the number of arithmetic problems they completed. While participants could influence the rate of presentation of the memory, visual and auditory sub-tasks by responding as soon as the computer generated the stimuli, participants had more control over their rate of responding on the arithmetic task. Thus, the number of points they earned was less restricted. Nonetheless, it is possible that these other types of tasks may be less sensitive to influence by monetary incentives than are production tasks, which are analogous to the arithmetic task. Little is known about the effects of monetary incentives on tasks other than production tasks, thus further research addressing this issue is warranted.

**Figure 1**

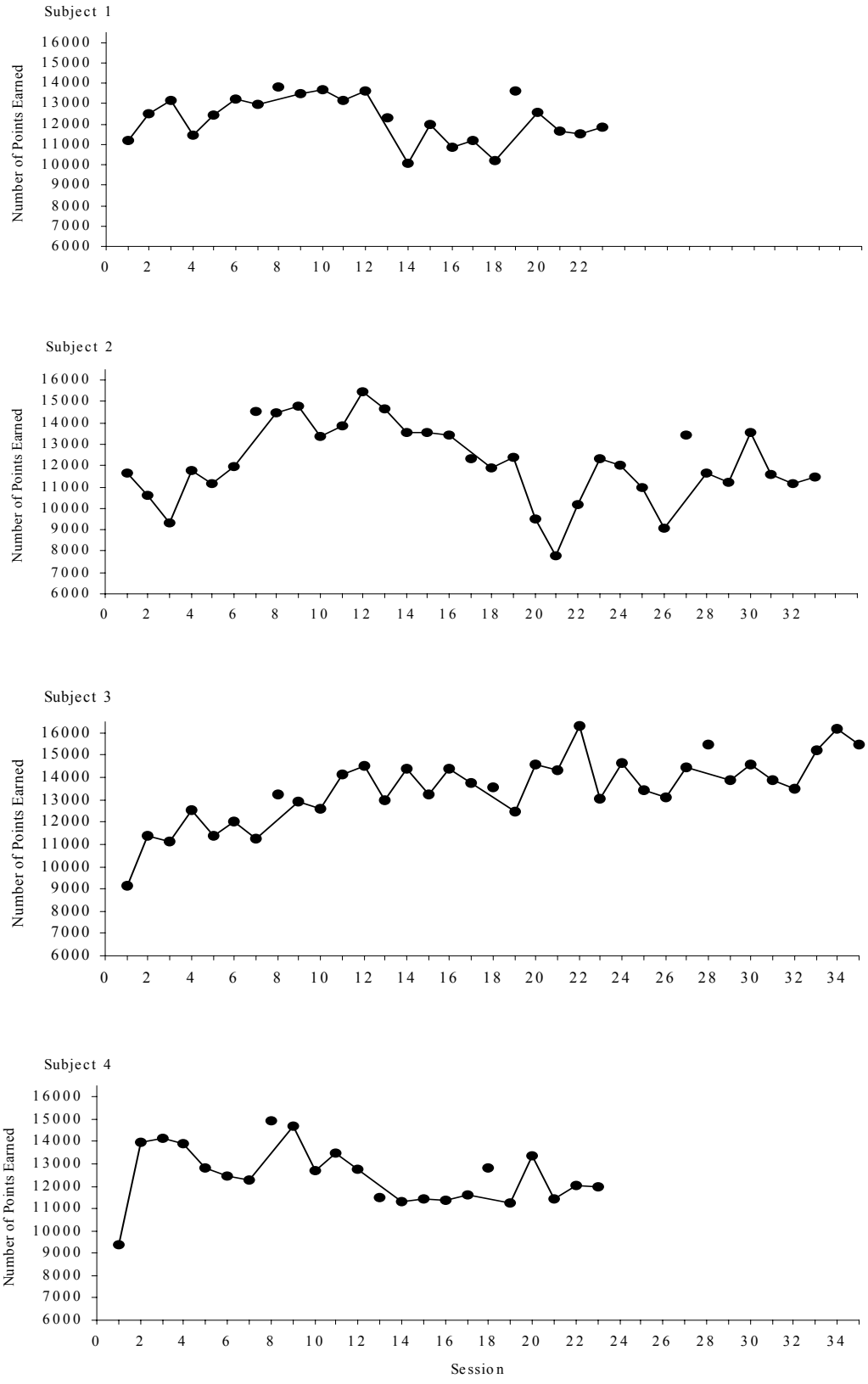
Subject 1
Subject 2
Subject 3
Subject 4
Number of Points Earned
16000
15000
14000
13000
12000
11000
10000
9000
8000
7000
6000
0 2 4 6 8 10 12 14 16 18 20 22
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34
Session

**Figure 2**

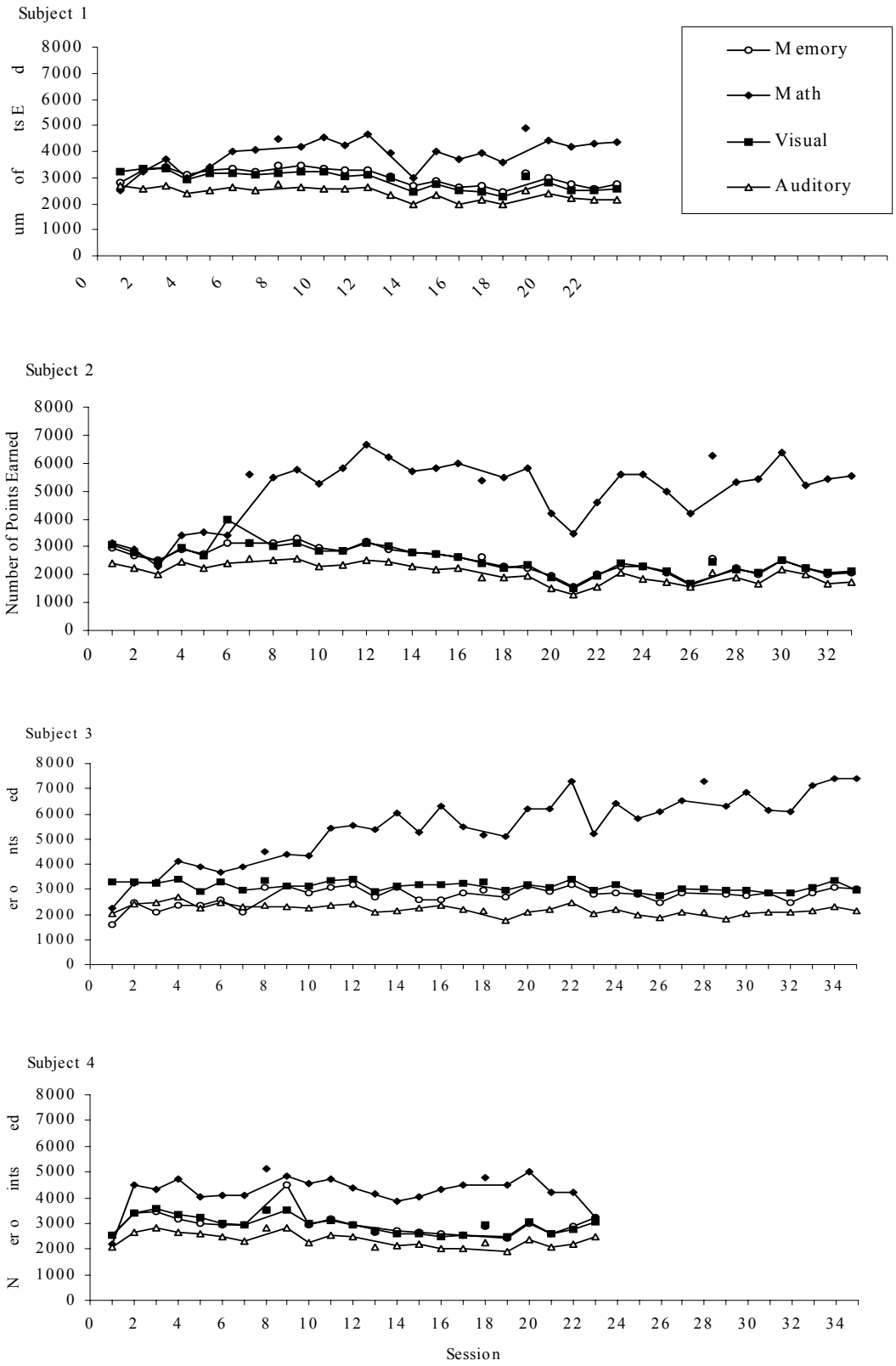
Subject 1
Memory
Math
Visual
Auditory
Subject 2
Number of Points Earned
Subject 3
Subject 4
Session

**Figure 3**

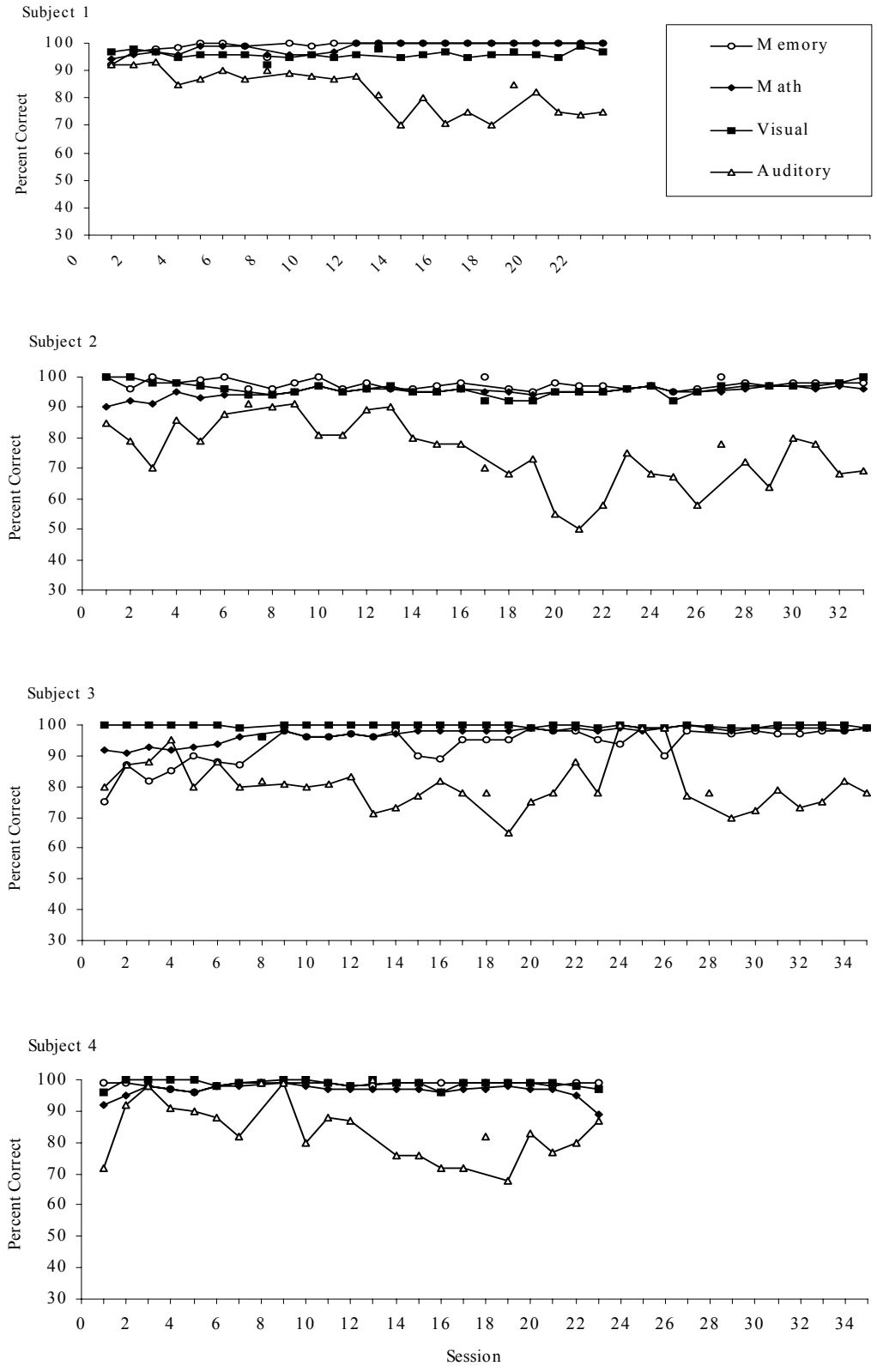
Subject 1
Subject 2
Subject 3
Subject 4
Percent Correct
Session
Memory
Math
Visual
Auditory

Figure 3 displays the percentage of correct responses on each of the sub-tasks for each participant. The four participants responded very accurately on the memory, visual monitoring and arithmetic sub-tasks across all phases of the study. Responding was less accurate on the auditory monitoring tasks and accuracy decreased over time; it was not, however, systematically affected by changes in the pay systems. Thus, accuracy was not differentially affected by the pay systems for any of the participants. It is particularly important to note that accuracy did not suffer when performance increased.

Participants rank-ordered the hourly pay, individual incentive pay and group incentive pay in terms of preference, satisfaction and evocation of stress on a post-experimental questionnaire. All four indicated that the individual incentive pay system was their most preferred pay system and the one with which they were most satisfied. Three of the four reported that the group incentive system was the most stressful and the hourly pay was the least stressful. In contrast, one ranked the individual incentive system as the most stressful and one ranked the individual incentive system as the least stressful. Participants were also asked to choose the pay system they would like to work under in the future. All four chose the individual incentive pay system. Thus, even though most of the participants found hourly pay to be the least stressful, all participants favored the individual incentive pay. When asked to explain their preferences on the questionnaire, participants indicated that they preferred the individual monetary incentive system because they earned more money under this system than under either of the other two systems, which was true. Thus, consistent with the results of previous studies (Bucklin &Dickinson, in press; Dickinson & Gillette, 1993; Honeywell et al., 1997), worker preference, satisfaction and choice were influenced by the amount of money earned. Nonetheless, it is the case that high performers will always earn more when they are paid individual incentives than when they are paid group incentives. Thus, for high performers, the amount of pay and the type of incentive system will always be confounded in actual work settings.

Finally, to assess the integrity of the group simulation, participants were asked to identify the number of people they thought participated in their work group during the small group monetary incentive phase on a post-experimental questionnaire. All four reported that there were 10 members in the group.

## DISCUSSION

Three of the four participants performed lower when they were paid small group monetary incentives than when they were paid individual incentives. These data indicate that high performers are likely to decrease their performance when they are paid small group monetary incentives, which supports the position of Dierks and McNally (1997) and Honeywell-Johnson and Dickinson (1999). Of interest is the fact that quality did not suffer when participants performed at higher levels. Participant reaction data indicated that all four participants preferred the individual monetary incentive system in spite of the fact that three of the four found hourly pay to be less stressful. In addition, three of the four reported that group monetary incentive pay was more stressful than either individual monetary incentive pay or hourly pay. As indicated earlier, all four participants reported that they preferred the individual monetary incentive system because they earned more money. Taken together with the performance data, these verbal statements imply that participants may have performed lower when paid group monetary incentives because their earnings decreased, as originally suggested by Dierks and McNally (1997).

This study is important in that it was the first to demonstrate that high performers may perform lower when they are paid equally-divided monetary incentives than when they are paid individual monetary incentives, although this phenomenon was suggested in two prior studies (Honeywell et al., 1999; London & Oldham, 1977). The results have important implications for organizational settings, particularly given the prevalence of small group

monetary incentives in business and industry. If there are distinct high performers in a small group, they may perform lower if they are paid group monetary incentives than if they are paid individual incentives, thereby decreasing the overall performance of the group. The nature of the work task may preclude the use of individual incentives; nonetheless, if they are a reasonable option, companies should consider them in light of these data. It is equally important to note that, in the current study, quality did not suffer when performance increased. If these results are replicated, employers need not fear that increases in performance will lead to decreased quality when individuals are paid individual monetary incentives. Finally, the results of this study help delineate the conditions under which performance differences will occur when workers are paid individual versus small group monetary incentives and may explain why the results of some of the prior studies have conflicted.

Performance is not the only concern when analyzing the effects of monetary incentive systems; rather, employee acceptance is critical to the success of a pay system as well. Moreover, Mawhinney (1984) has insightfully argued that behavior analysts have an ethical responsibility to evaluate employee satisfaction: "If we are seriously committed to the values of improved productivity *and* [sic] job satisfaction we must come to grips with the satisfaction issue. Our theory is clear on this point. We can achieve high productivity *and* [sic] high satisfaction. But we can also achieve high productivity *with* [sic] low satisfaction. Unless we measure Eden-actual value received discrepancies (dissatisfaction) we cannot hope to achieve our equally worthy objectives of high productivity and high satisfaction" (p. 23). In the current study, all four high performers expressed strong preference for the individual monetary incentive system. Three of the four found group monetary incentives to be more stressful than either individual incentive pay or hourly pay. While it is certainly the case that individual monetary incentive systems can be designed in such a way as to be exploitative and aversive[9], the data herein suggest that individual incentive systems can, when designed well, evoke more positive reactions from high performers than either hourly pay or group monetary incentive pay. On the other hand, it should be pointed out that low performers are likely to prefer group monetary incentive pay and find that type of pay to be more satisfying (Honeywell et al., 1997).

There are limitations to the generality of the results of this study. First, the group was simulated, eliminating social influences on performance. While this procedure has experimental advantages in that it prevents within- and across-study confounds due to uncontrolled interactions among group members, such social interactions could well influence the results in other settings. For example, praise and recognition from others may sustain the high performance of individuals when they are paid small group monetary incentives. Links to other potential organizational rewards, such as increases in base pay, preferred work schedules and vacation days, promotions, etc., could also sustain such high performance. Second, task structure could influence the results. In the current study, as in all of the studies that have compared the effects of individual and equally-divided small group monetary incentives, the task was "additive." That is, the performance of each member of the group was independent and added together to determine the group's performance. Interdependent tasks may lead to different results. As suggested in the current study, the type of task could also affect the results. Production tasks and tasks where the rate of performance is largely controlled by the individual (tasks that are analogous to the arithmetic task in this study) may be more susceptible to influence by monetary incentives, and hence, to performance differences when linked to individual versus group monetary incentives than tasks that are analogous to the other types of tasks in this study (memory, visual monitoring, and auditory monitoring tasks). Four, different feedback procedures might lead to different results. In this study,

3. [9] For a discussion of the factors that make monetary incentive systems aversive and how they can be avoided, readers are referred to Dickinson and Gillette (1993), pages 10-14.

participants were given individual feedback when they were paid hourly and when they were paid individual incentives, but given only group feedback when they were paid group incentives. In business and industry, when employees are paid group incentives they typically receive only group feedback. In fact, often, the only performance feedback employees receive are the monetary incentives themselves. Thus, the group feedback procedure was used because it reflects current practice. Nonetheless, results may differ if individuals receive individual feedback along with group monetary incentives. Finally, the size of the group may influence the results. In the current study, participants believed that they were members of a ten-person group. If high performers believed that the group was smaller (or, if indeed it was smaller), their performance might be maintained under group monetary incentives, due to the fact that their performance contributes proportionately more to the group's performance and thus they have more control over their own earnings. Therefore, "top performers may recognize, particularly in small groups, that decreases in their own performance would lead to further reductions in their earnings" (Stoneman &Dickinson, 1989, p. 147).

The limitations of generality discussed above provide direction for future research. Additionally, one logical extension of the study is to determine whether individual and small group monetary incentives have different effects on average and low performance. As argued earlier, it is likely that performance will not differ under individual and group monetary incentives if all members of the group perform similarly. However, it is not clear that average performance would remain the same if an individual is aware of the fact that other members of the group are performing considerably higher or lower. Nor is it clear how low performance would be affected. Honeywell et al. (1997) argued that low performers are likely to continue to perform below average when switched from individual to group monetary incentives because they benefit from the labor of other group members. The results of one study (London & Oldham, 1977) support their argument. The study was conducted for other reasons, however, and although the data were highly suggestive, the authors did not conduct statistical tests that compared the performance of low performers when they were paid individual incentives and when they were paid equally-divided group incentives that were based on the average performance of the members of the group. However, in that same study, when low performers believed that their partner performed 25% better than they did and received incentives based on the performance of their partner (rather than on the average performance of the two), low performers increased their performance considerably. Thus, when faced with extreme overpayment, low performers may increase their performance. Clearly, the results of the current study together with those reported by London & Oldham (1977) provide fertile ground for further research.

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