EFFECTS OF GROUP RESPONSE-COST PROCEDURES ON CASH SHORTAGES IN A SMALL BUSINESS

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The effect of a group response-cost procedure (accompanied by verbal and written instruction) designed to decrease cash shortages in a small business was evaluated with a reversal design. When cash shortages were subtracted from the six employees' salaries on days in which the shortage exceeded 1% of total daily sales, the magnitude of daily shortages sharply decreased. This response-cost contingency was used only three times throughout the study, with a maximum cost of \$8.70 per subject over the 41-day period. The efficacy of the procedures may be due to either increased precision in change calculations, a decreased frequency of stealing from the cash register, increased shortchanging of customers, and/or increased incidents of register under-ring. Ethical questions relative to the utilization of group punishment procedures are raised, and it was concluded that the procedures used were more humane than commonly used alternatives.

DESCRIPTORS: behavioral instruction, business problems, group contingencies, group consequences, job performance, response cost, theft reduction

Skinner (1953, pp. 384-401) and others (Aldis, 1966; Brethower, 1972; Hughes and McNamara, 1966; Kagel and Winkler, 1972; Nord, 1969; Verhave, 1966) have suggested that the techniques of applied behavior analysis might be used in business settings to solve problems such as quality control, employee motivation, discipline, training, and executive development. However, there is a paucity of empirically demonstrated applications of behavior principles to industrial or small-business questions. A review of the behavioral literature revealed only a few systematic investigations (Gupton and Lebow, 1971; Hermann, de Montes, Dominquez, Montes, and Hopkins, 1973).

Small businesses are faced with many personnel problems that might effectively be solved by

a behavioral approach. One particularly serious problem is employee theft, with estimates of losses as high as six billion dollars annually (Lykken, 1974). Traditionally, this problem has been handled by hiring private detectives or extra security personnel, strategically placing cameras as surveillance devices, and most recently by using "lie detectors". The latter method "has grown so rapidly in recent years as to threaten to become a major industry" (Lykken, 1974, p. 725), even though the general psychometric efficacy of the lie-detector test is dubious (Lykken, 1974). Moreover, in some cases, employer loss might be due to employee carelessness in financial transactions, although a distinction between careless errors and purposeful theft is often difficult to make. Rather than making an effort to apprehend and discharge those engaging in stealing or careless behavior after-the-fact, it would be more efficient to reduce the undesirable behavior itself.

One procedure readily available to business for reducing employer losses is response cost (Kazdin, 1972; Weiner, 1962), which entails removal of a reinforcer following an undesired response. The removal may be either the loss

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of a point or privilege, or the withdrawal of a tangible object (e.g., money) in the subject's possession, contingent on undesirable responses, and results in suppression of the responses (Leitenberg, 1965). An immediate question arises relative to the use of response cost for stealing and/or inaccurate change-making behavior in business settings, because the employer often cannot identify the employee or employees responsible for the identified loss. To overcome this dilemma, response cost can be applied to employees as a group, rather than to individuals. Similar procedures involving reinforcement of individual members within a group for the behavior of the entire group have been successfully used with various classroom populations (e.g., Packard, 1970; Schmidt and Ulrich, 1969).

The utility of group contingency procedures alone and individual response-cost procedures alone has been repeatedly demonstrated; the aim of the present research was to combine both procedures to solve a common small-business problem. More specifically, the present experiment attempted to use instructions and a group response-cost contingency to reduce cash shortages in a small-business setting.

METHOD

Setting

The study was conducted on the premises of a family style restaurant, located in an urban midwestern community. Fifteen full- and part-time people were employed by this small business which operated seven days a week from 9 a.m. to 1 a.m. The interior of the facility was divided into two large areas; in one, customers ordered and received food in a self-service fashion; beverages and table-seating were available in the second area. All transactions were on a cash-only basis. An NCR Class 22 cash register was located in each room. Both registers were professionally serviced just before the study and were found to be in excellent working order. Each register had an internal tape that cumulatively recorded each day's total cash receipts.

Subjects

Two female and four male subjects, full- and part-time cashiers, participated. As part of their job, each cashier was required to take money from customers, make change when necessary, and deposit the customer's money appropriately in the cash register. On any particular day, a minimum of three and a maximum of six cashiers were scheduled to work (average of four).

Procedure

After each business day, the restaurant manager collected the cumulative tapes from the two cash registers. By adding the totals from each register tape, the entire day's sales figure was determined. Next, the cash in each register was collected, combined, and counted. Finally, the cash total was compared to the register-tape totals to determine if a discrepancy existed.

An ABAB reversal design consisting of Baseline I, Group Response-Cost I, Baseline II, and Group Response-Cost II was employed to evaluate the effectiveness of the experimental procedures in eliminating daily cash shortages.

Baseline I. For five days, the restaurant manager recorded the amount of cash shortage and computed the percentage of the day's total sales receipts it represented. No systematic feedback was delivered by the manager to employees.

Group Response-Cost I. On Day 6, the manager introduced the group response-cost contingency. If any single day's cash shortage equalled or exceeded 1% of that day's sales receipts, the total shortage, divided by the number of cashiers working that day, was subtracted from each cashier's salary for that particular day.² The amount subtracted was recorded on each individual subject's time card after each working

²Cautionary note: the group response-cost procedure must be applied within certain limits to comply with federal law such that the amount of money subtracted from any single employee must not reduce that employee's gross wage below that established for that individual by the minimum-wage clause of the Fair Labor Standards Act (Lopatka, 1975). Present procedures were well within this law.

day. In other words, if five cashiers were working and the shortage that day was \$10, each cashier would be penalized \$2. Signs were placed adjacent to both cash registers stating the contingencies in effect. The contingency was also verbally stated to individual employees by the restaurant manager on Day 6. The initial group response-cost condition continued for 12 days.

Baseline II. On Day 18, the group response-cost contingency was removed. The manager replaced the signs adjacent to both cash registers with new ones announcing that:

I am very pleased with our recent consistent lack of serious cash shortages. Therefore, I will no longer be subtracting money from your paychecks.

Group Response-Cost II. The group response-cost contingency was re-instated on Day 21 and applied to Day 20's cash shortage. Manager-delivered instructions in the form of signs and a verbal statement on Day 21 announced that:

Due to recurring serious cash deficits, I will again be subtracting any shortages from your checks on days when the cash shortage equals or exceeds 1% of the total receipts. This will apply to yesterday's shortage and will continue until further notice.

Group Response-Cost II lasted for 21 days.

Reliability

The currency in both cash registers was combined and counted by the restaurant manager at the end of each working day and the money placed in a bank envelope for daily deposit. The bank's deposit receipt served as an independent record of each day's total cash. Reliability was calculated by dividing the manager's cash total by the bank's cash total. The level of agreement thus derived averaged 1.00 with a range from 0.99 to 1.01.

RESULTS

Figure 1 shows the percentage of cash shortages or overages throughout the experiment.

This percentage was obtained using the following formula:

$$\frac{\text{total day's cash register entries} - \text{actual cash}}{\text{total day's cash register entries}} \times 100$$

Baseline I. Baseline I data reveal a mean daily shortage of 4.02%. Each day's shortage during the initial baseline condition exceeded 1%, ranging from a low of 1.13% to a high of 8.97%.

Group Response-Cost I. Implementing the group response-cost contingency for daily shortages equalling or exceeding 1% resulted in an immediate drop from the preceding mean baseline shortage of 4.02% to a mean of 0.43%, a drop of 3.59%. In the first group response-cost condition lasting 12 days, only two points exceeded the 1% criterion level with a range from 1.22% short to 0.32% over.

Baseline II. Removing the group response-cost contingency and re-instating the baseline conditions, immediately increased the percentage of cash shortages per day to 3.58%, 6.10%, and 2.81%. This represented a mean increase of 3.73% from the first experimental condition.

Group Response-Cost II. Re-instating the group response-cost procedure resulted in a mean reduction of cash shortage to 0.04%. The range was from 0.80% short to 1.16% over. During the 21 days of the second condition, zero days exceeded the 1% shortage criterion level, and 10 days showed cash overages.

Figure 1 reveals that both group response-cost periods immediately decreased cash shortages, with trends over time toward continued decreases.

DISCUSSION

The group response-cost contingency immediately reduced the undesired cash shortages exhibited during baseline conditions. Two factors were probably simultaneously contributing to the observed differences between daily receipts and actual cash; namely, (1) employee theft, and (2) errors due to employee carelessness in change calculations. Errors may have been re-

Fig. 1. Percentage of daily shortages (points above x-axis) or overages (points below x-axis) under conditions in which no feedback was delivered (baseline) and conditions in which fines were levied on days when the percentage of cash shortage equalled or exceeded 1% of total daily receipts (group response cost). The percentage of daily receipts (solid line) and amount of dollars (dotted line) are plotted separately. The horizontal line represents the 1% shortage criterion for the group response-cost contingency.

sponsible for the frequent cash overages noted in the second experimental period. While the data do not permit determination of whether the response-cost contingency reduced stealing, increased cashier change-counting accuracy, or both, the results indicate the efficacy of the procedures in alleviating discrepancies between actual cash and register receipt totals.

Several considerations deserve comment. The procedures were effective in reducing losses even though the response-cost contingency was used only three times throughout the study. Moreover, the magnitude of response cost, referring to the value of loss, was minimal. Specifically, response-cost fines of \$3.25, \$2.71, and \$2.74 were levied on Days 7, 9, and 20 respectively, for a total cost of \$8.70 per subject. That the actual fine need not be large to show suppressive effects is consistent with the findings of Siegel, Lenske, and Broen (1969), who reported a decrease in performance of a target response (*i.e.*,

inappropriate speech) following a cost of 1¢ per response. The verbal and written instructions themselves may have accounted in part for the observed reductions in the target response. Skinner (1966, 1969) and Marholin, Siegel, and Phillips (*in press*) have discussed the importance of instructions alone in prompting later specific behavior and suggested that instructions about the contingencies of reinforcement can serve as discriminative stimuli for reinforcement or punishment. Furthermore, the fact that large and frequent fines are unnecessary enhances the practicality of response-cost procedures in business, where large and frequent fines might result in untenable employer-employee relationships.

While it has been suggested that the decrease in cash shortages represents either a reduction in employee theft and/or an increase in change-making precision, several other alternatives exist. It is possible, for example, that the victim became the customer instead of the employer; *i.e.*,

the employees resorted to short-changing the customer rather than taking money directly from the cash register. Another possibility is that the cashiers may have increasingly been under-ringing sales. These possibilities might be addressed in future research by including regular, unobtrusive observations of cashier-customer interactions (*e.g.*, frequency of customer complaints) with direct observation of the cashiers' behavior (*e.g.*, register-ringing accuracy).

Goldiamond (1974), Martin (1975), and Wexler (1973) have expressed specific concerns directed toward the related issues of programmed contingencies, especially when they involve aversiveness, human rights, and constitutional responsibilities. These questions are particularly pertinent to applications of aversive contingencies to groups of individuals when possibly only one or several individuals within the group are responsible for potentially punishable behavior. Several authors have attacked the broad use of behavior modification because of its compelling interest in manipulating the individual into accepting particular values or rules, thereby depriving him of his constitutional legal rights (Buckley, 1971; Heldman, 1973), but these same individuals have consistently ignored the concept of choice in any environmental approach to behavior change. In any contingency situation, the person involved has the option of either (1) engaging in the target behavior or (2) not engaging in the target behavior. Additionally, in the present investigation individual employees had the opportunity to express their displeasure with the response-cost contingency to their employer; no such complaints were observed. Although overlooked in the present investigation, it is suggested that future attempts to use procedures described here should include prior discussion and input from employees as well as periodic formally solicited, anonymous opinions concerning any agreed procedures (Pierce and Risley, 1974). Such verbal interchanges would allow the employer to choose a procedure acceptable to employees over less palatable alternatives (*e.g.*, covert surveil-

lance or phoney customer-detectives) which are often coupled with possible firings and court prosecutions.

A group contingency like the one described in this report, publicly and clearly stated as part of a job description, may be viewed as more ethical and humane than the alternatives of group surveillance or the use of lie detectors. One word of caution must be offered concerning the application of group or individual contingencies in any business setting in which employees are organized into unions, other employee organizations, and/or individuals have written contracts. In such situations, implementation of any type of performance contingency may or may not be compatible with union or individual contracts and should be carefully evaluated in terms of possible violations. Any system can be abused if individual rights are not considered. We contend, however, that a clear and public statement of rules is more justifiable than the use of secret investigative techniques.

This study demonstrated that a procedure, which included a group response-cost contingency and manager-delivered written and verbal instructions specifying the contingencies in effect, successfully reduced cash shortages in a small business. However, this procedure should be used cautiously until more is known about the employee behaviors responsible for reduced cash losses. If employee theft was responsible for the original losses, and if the procedure simply shifted employee theft from the owner to the customers, only the restaurant owner's problem has been solved, and society's problem remains. Thus, the present procedure should be viewed only as a potentially useful alternative to current practice in this area. It is also not the only behavioral procedure that might be used with this common business problem, and is not necessarily the best of these procedures.

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