EFFECTS OF BONUSES FOR PUNCTUALITY ON THE
TARDINESS OF INDUSTRIAL WORKERS¹

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This study evaluated the effectiveness of an incentive procedure designed to increase the punctuality of six workers who were chronically late to work in a manufacturing company. The six workers in the experiment received a 2.00 pesos (\$0.16 U.S.) bonus for every day that they arrived on time. A reversal design was used. The contingent bonuses increased the workers' rates of punctuality compared to their baseline rates. A control group of six workers observed during the same 77-week period showed a trend toward decreasing punctuality. These results suggest that the use of small daily bonuses is a practical procedure for modifying chronic tardiness among industrial workers.

The possible application of behavior analysis techniques to industrial settings has been suggested by Skinner (1953, pp. 384-401), Aldis (1966), Hughes and McNamara (1966), Lindsley (1966), Verhave (1966), Cumming (1966), Nord (1969), Bermúdez and Rodríguez (1970), Emery Air Freight Corporation (1970, 1971), Schmitt (1969, 1971), Gupton and Lebow (1971), and Brethower (1972). However, experimentally proven applications have been limited. Secondary sources (*Business Week*, December 18, 1971) indicate that Emery Air Freight is extensively employing a variety of techniques, but their reliable effectiveness is unknown. Gupton and Lebow (1971) report that they increased the frequency of a low-probability sale by making the possibility of high-probability sales contingent on them.

Industrial organizations have to resolve many behavioral problems. These include training

and development for executives, work slowdowns, violations of safety rules, *etc.* In México, the setting of this research, workers' tardiness in reporting to work is one of the most important problems with which many industries have to deal. Some companies handle this problem by implementing monthly bonuses, annual bonuses, and/or punishment procedures. A common practice among companies in México City is the suspension for one day without salary for each three tardies in a period of 30 days.

However, on many occasions, these kinds of programs do not have enough power to control the occurrence of the behavior. In such cases, management usually implements other alternatives, such as increased punishment and/or disciplinary interviews. In the interviews, the person in charge of personnel administration asks the worker about problems that could be producing his lack of punctuality. He also may threaten the worker by saying things such as: "The next contract is not going to be renewed." "Your promotion to a better position could be withheld, unless you improve your punctuality."

In one plant of Ideal Standard S.A., in México City, 131 workers accumulated 750 tardies during 1970. The problem existed even though the company had an annual bonus for punctuality and attendance. Also, supervisors of work-

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ers sometimes punished a worker with a suspension of one day without salary for each three tardies within a period of 30 days. The aim of the present research was to develop another alternative to control tardiness among workers in that plant.

METHOD

Subjects

Twelve male workers at Ideal Standard S.A., México City, México, took part in the experiment. They were selected by the experimenter because they had chronic problems with tardiness (10 tardies or more) during the 1970 work year.

These 12 men were assigned to two groups, a treatment group and a non-treatment or control group, according to the order in which their names appeared on the company payroll.

The men had worked at the company for an average of 4 yr. Only three of them had previous experience in industrial work. All other subjects had prior experience in only agricultural work. Their ages ranged from 19 to 40 yr. Only four subjects had finished grammar school, which includes six grades in Mexican schools.

Setting

The setting was a factory with 131 blue collar workers and 40 salaried employees. It was located in the outskirts of México City. Its sales volume was about 2 million pesos a month (\$160,000 U.S.). The company, a division of a large U.S. corporation, was small. It was organized into five production departments and eight service departments. Semi-skilled labor was used for both production and service. The average daily pay of the workers was 50.00 pesos (\$4 U.S.), ranging from 37.50 pesos (\$3 U.S.) to 85 pesos (\$6.80 U.S.). There were two supervisory levels between the workers and the plant manager.

Response Criteria

Punctuality was defined as the act of clocking the time punch card at the designated time or

earlier to start work. For example, if the time for a man to begin to work was 7:00 a.m., he had to clock his card on or before 7:00 a.m. If a worker clocked in one or more minutes past 7:00, he was considered late. The station where the workers clocked their cards was situated about 5 m from the main door of the plant.

Procedures

The experimenter talked to the members of the treatment group individually and explained that it was in his particular interest to carry out an experiment regarding worker punctuality. He explained the procedures of the experiment to each worker before he was asked to participate. Each worker was told that: (1) each day he arrived on time, he would receive a slip of paper stating "Mr. 'X', for arriving before 7:00 a.m. on September 6, 1971, has earned 2.00 pesos (\$0.16 U.S.)", or "1.65 pesos (\$0.13 U.S.)" if he had to work six days per week. This was done in order to equalize the amount of money that each worker might receive each week, 10.00 pesos (\$0.80 U.S.); (2) each Friday or Saturday (as the case might be), he would be able to cash in his slips to the Supervisor of Industrial Relations (the experimenter); (3) each slip of paper would be attached to the punch card, which in turn would be handed by the guard to each worker as he arrived at the factory; (4) if he were late, he would lose the money only for that day; (5) if he were absent for any reason, he would lose the punctuality bonus.

The workers knew that the union had been informed about the experiment, and that union officials had raised no objections. They also knew that any income that they received as a result of the experiment was absolutely free from taxes and other discounts. There also would be no loss of any legal right in accordance with labor law or the collective contract.

The factory had used an annual punctuality and attendance bonus for blue collar workers for about 6 yr. The bonus system included: (a) a prize of 500.00 pesos (\$40 U.S.) given to the

10 workers who had the best attendance and punctuality records during a year, (b) 10 prizes of 400.00 pesos (\$32 U.S.) given to the 10 workers with the next best records, and (c) 20 prizes of 300.00 pesos (\$24 U.S.) given to the 20 workers with the next best attendance and punctuality records.

The company also had established that if a worker was tardy more than three times within a period of 30 days, he could be suspended for one day without salary. This suspension might occur the following week or even two or three weeks after the third time the worker was tardy. In addition, if a worker arrived more than 10 min late, the supervisor had the option to let him come to work or tell him that he would be unable to work until the next day. Very often this decision was influenced by the requirements of production and/or the relationship between the worker and supervisor, and these punishment procedures were not reliably employed by the supervisors.

Observation and Reliability Procedure

The time of arrival was obtained for each man by reading the time clock's impression printed on his time card. The baseline for the two groups was determined by reviewing the punch card records for the year 1970. No reliability check was obtained during baseline condition. However, it was an established routine in the company to have a guard check the workers as they punched their cards to assure that a worker did not punch someone else's card. If a worker was discovered to have clocked another worker's card, both workers could be sanctioned with a suspension from one to eight days. The repetition of this offense could culminate in workers being fired. The personnel files were reviewed in an attempt to find out if any of the workers in the experiment had committed such an offense before. There was no evidence to that effect.

The guard positioned by the time clock was assigned to deliver the time cards to each worker. He was also asked to deliver the slips

to the workers contingent on punctuality. During the first 10 weeks of the research, the experimenter checked three times to see that the slips were being delivered contingently. The guard was always carrying out his instructions.

From the eleventh week to the end of the research, the reliability checks on the guard's behavior were made by the production manager of the company. These were taken three times each week and reported to the experimenter. The guard was always carrying out his instructions. The hour of the clock was set on the official government time. The routine of setting the clock was carried out each morning about 1 hr before the workers' arrival time.

Design

During the first 12 weeks of the experiment, the men in the treatment group worked under baseline conditions. For the next eight weeks, the workers in the treatment group were under the bonus procedure as described above. After the first treatment condition, the second baseline condition had a duration of four weeks. The experimenter introduced the second baseline condition by telling each worker that the payment for punctuality was going to be suspended, and that they would be told if the experiment was to be reinstated. Each time that the treatment or baseline condition was introduced, they received the same instructions.

Treatment conditions were again in effect two more times, the second time for nine weeks, and the third for 32 weeks. The baseline condition was in effect only one more time for 12 weeks.

The workers of the control group were not told about the experiment. The men in both the treatment and control groups continued to work under the general company bonus and punishment procedures during the experiment. However, all of the men were quickly ineligible for the general bonuses because of tardiness during the first few weeks of data collection, and their supervisors never employed the punishment procedures when they were tardy.

RESULTS

Figure 1 shows the per cent of instances of tardiness throughout the experiment for the treatment and control groups. This per cent was obtained using the following formula:

$$\frac{\text{Number of workers late during two weeks}}{\text{Total number of possibilities of attendance in two weeks}} \times 100$$

The total number of possibilities of attendance was obtained from the multiplication of total number of workers times the number of days that the workers went to work.

During the first baseline condition, which lasted 12 weeks, there were 47 instances of tardiness for the treatment group, an average of 15% per day. Seven tardies were accumulated in eight weeks, making an average of 2.5% per day during the first treatment period. In the second baseline condition, 10 instances of tardiness occurred for an average of 8% per day. During the nine weeks of the second treatment condition, four tardies occurred, reaching an average of a 1.8% per day. For the third baseline condition, the average was 6.5% per day. In the last treatment condition, 22 instances of tardiness were accumulated over 32 weeks, for an average of 2% tardies per day. The upper coordinates of Figure 1 show the per cent of instances of tardiness throughout the experiment for the control group. The average for the experiment was 9.8%. For the first 28 weeks, the per cent was low. Nevertheless, during the next 50 weeks, tardiness increased until the percentage was consistently 3% or higher and averaged about 12% during the last 26 weeks of the experiment.

The range of the mean number of minutes late for workers per week during all baseline conditions was from 1.4 to 3 min. For all treatment conditions, the range was from 0.4 min to 0.8 min. Nevertheless, given that a worker was tardy, the total minutes of tardiness was constant over conditions. In other words, the treatment procedures reduced the frequency of

tardiness, but did not change how late a worker would be if he were tardy.

The average number of minutes that the men arrived early before their assigned times to begin to work was positively correlated with the treatment conditions. This average was obtained by adding the number of minutes of early arrival for all the workers during two weeks, and dividing this figure into the total number of workers. During baseline conditions, this average ranged from 31 to 49 min of early arrival each two weeks. For treatment conditions, the range was from 42 to 55 min. On the other hand, the control group averaged 47 min for the 77 weeks of data collection.

Figure 2 presents, in the upper part, the data of the subject from the treatment group with the fewest tardies (the best subject) during the experimental conditions. The data are expressed in terms of per cent of instances of tardiness in blocks of two weeks. For the first baseline condition, the subject was tardy an average of 22% of the work days. During the first treatment condition, the average was 0%. An average of 9% was reached during the second baseline condition. Through the second treatment condition, the average was 2%. During the last baseline condition, the average was 4.3%. The average for the third treatment condition was 1.2%.

The lower part of Figure 2 shows the data for the subject in the treatment group with the most tardies (the worst subject) during the experimental conditions. The data also are plotted in blocks of two weeks. For the first baseline condition, the worker averaged being tardy 13.7% of the days. During the first treatment condition, the average was 6.2%. An average of 10% was reached in the second baseline condition. Through the second treatment condition, the average was 5.6%. During the third baseline condition, the average was 12.6%. The average for the last treatment condition was 5.4%.

DISCUSSION

The contingent payment for punctuality reduced the rate of tardies of the workers of the

Fig. 1. The upper coordinate presents the per cent of instances of tardiness of the control group. The same data from the treatment group are presented on the lower coordinate. The arrows indicate that the points are based on one week instead of two weeks of data collection. Horizontal lines represent means for each condition.

treatment group. Meanwhile, in the control group, the trend of the rate of tardies was increasing. Each time that the bonus for punctuality was in effect, the rate of tardies was immediately and clearly reduced. This effect was replicated three times during the experiment, with an accumulation of 49 weeks under the treatment condition. The last treatment condition had a duration of 32 weeks (60% of a work year). In contrast, each time the workers were in baseline conditions, the rate of tardies increased. These results are similar to those reported by Phillips (1968), who reduced the

frequency of tardies of three teen-aged boys. The boys lived in a home that employed a token economy, and they received contingent fines every time they were late coming home and going to bed. Nord (1969) reported anecdotal data about how a hardware company, using a lottery system, reduced workers' absenteeism and tardiness.

The reduction in tardiness obtained under the treatment condition was clearly replicated for each of the subjects in that group. Even the "worst" subject (the subject who had the highest frequency of tardiness during treatment con-

Fig. 2. The per cent of instances of tardiness of the subject from the treatment group with the fewest tardies ("best subject") during experimental conditions are presented in the upper coordinates. In the lower coordinate is presented the subject from the treatment group with the most tardies ("worst subject") during the experimental conditions. The arrows indicate that the points are based on one week instead of two weeks of data collection. Horizontal lines represent means for each condition.

ditions) was tardy less frequently as a result of the bonus.

Each time that the bonus procedure was in effect, the workers began to arrive at work earlier. Casual observations indicated that the men who arrived early generally did not begin their assigned tasks before their designated time to start work. However, the chances that they began to work at the designated time were higher because they were at least in the factory.

There was no difference in the length of the tardies during treatment conditions and baseline conditions. In other words, the rate of tardies was reduced, but the length of a tardy did not change when a worker arrived late.

One of the possible reasons for the effectiveness of the bonus for punctuality procedure was that the workers had the opportunity to earn the bonus every day, with the exchange of the slips for money at the end of each week. In this way, arriving on time was immediately reinforced with the slips of paper that were later exchanged for money. This proved to be an effective behavior control procedure, as has been demonstrated in other token economy studies (Phillips, Phillips, Fixsen, and Wolf, 1971). It contrasted with the company's usual procedure, where the workers had to wait until the end of the year to receive a bonus for attendance and punctuality.

The present procedure might be considered impractical by personnel management because of the paper work involved. However, it could be considered as remedial and could possibly be changed gradually into a monthly, bimonthly, *etc.*, bonus system. In this way, it could be used as a tool to establish punctual behavior for workers who do not have this kind of repertoire. In fact, in the research reported by Phillips *et al.* (1971), the Achievement Place program started working with delinquent youths with a daily point system. Later, they changed to a weekly system. If they continued to behave appropriately for several weeks, they entered into a merit system in which tokens were not employed.

There are several possible reasons why industrial workers do not perform at 100% efficiency. Among those, tardiness is one of the most important. Here, it should be established that a worker could be on time arriving at the factory, and still not begin his assigned work. Decisions to employ a procedure such as the present one should be based on financial considerations as well as on the procedure's effectiveness to produce punctuality. Ideal Standard S.A. estimated that each minute of work of each worker cost the company 0.21 pesos (\$0.01 U.S.). However, no data were taken on the times the workers actually began working at their assigned jobs once they had clocked into the plant. Therefore, it is not possible to examine the actual cost or saving of the procedure to the company.

Nord (1969) and Brethower (1972) made detailed analyses of the possibilities for the application of operant conditioning procedures to management problems. They speculated that procedures systematically similar to the one investigated in this experiment could be effectively applied to problems such as quality control, employee work motivation, discipline, training, and executive development.

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