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Increasing Productivity with Decreasing Time Limits: A Field Replication of Parkinson's Law

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A field replication of Bryan and Locke's general version of Parkinson's Law (effort is adjusted to the difficulty of the task) was attempted. The principle implies greater effort on a given task when time restrictions are placed on task completion than when there are no such restrictions. As predicted, logging crews ($N = 379$) showed a significantly higher rate of output when limited to mill deliveries on 1 or 2 days a week than when no such buying restrictions were in effect. Since both owners and crew members were paid on a piece-rate basis, there was an incentive to maximize production early when restrictions were operative.

Two previous laboratory studies by Bryan and Locke (1967) yielded support for Parkinson's Law: Work expands to fill the time available for its completion (Parkinson, 1957).[1] The more general version advanced by Bryan and Locke (1967) stated that: "effort (or work pace) is adjusted to the perceived difficulty of the task undertaken" (p. 260). Thus, if the time available to complete a given task is longer than needed, the pace will be slowed to fill the allotted time. On the other hand, if the time allotted is minimal, the pace will be adjusted in order to complete the task before the deadline. The foregoing assumes, of course, a firm commitment to completing the task and to remaining within the time limit.

Bryan and Locke (1967) found that subjects given twice the time needed to complete a set of simple addition problems took significantly more time to complete them than subjects given the same number of problems with just enough time to complete them. That is, subjects worked faster with shorter time limits than with longer time limits. These differences in performance were mediated by differences in the conscious goals held by the subjects. Those with shorter time limits set harder goals than those with longer time limits.

While the above results were clear-cut in a laboratory setting, the principle's applicability to a real-life work situation still remains to be demonstrated. The present investigation attempted to present such evidence using data obtained from the logging industry.

Industrial pulp and paper mills in the South generally purchase timber from independent logging crews that harvest the timber and haul it to a woodyard. Periodically, the amount of wood supplied by the wood harvesters exceeds the mill's capacity to process it. This is especially likely during the summer months when weather conditions are most favorable and there is an ample supply of labor. To limit supply in such cases, the mills may put buying restrictions or quotas into effect.

The usual procedure is to restrict buying from the harvesters to fewer days per week. For example, the mill may buy wood only on the first 2 days of the week. This may be done on a first-come, first-serve basis; or, each harvester may be allowed a fixed quota of deliveries with a high probability of bonus deliveries for completing the quota early in the week.

The harvester who wants to minimize income loss in the face of these restrictions must increase his output rate (speed of work) so as to deliver a maximum amount of wood to the mill in a minimum amount of time (e.g., in the early part of the week). This is because he does not have the capital to keep a backlog of wood ready for delivery to suit his convenience or need for higher income. As soon as the wood is cut it must be debarked and sprayed to prevent insects and/or fungus from reducing its commercial value. Thus, wood is generally delivered to the

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[1] Technically, this is not the substance of Parkinson's Law itself (which states that the size of any public bureaucracy grows at a fixed rate regardless of the amount of work) but rather the principle which makes the law possible. Since work expands to fill the time available for its completion, there need be no relation between staff size and the amount of work accomplished.

mill on the very same day that it is cut. The assumption that the wood harvester wants to maintain his earnings seems valid in that, over and above desiring a profit, he needs sufficient income to cover his costs, especially those involving payment on and maintenance of expensive equipment. Since crew employees are paid on a piece-rate system, increasing the speed of work in response to quotas would also benefit them.

Thus, it was predicted that wood-harvesting crews would show higher output per man-hour when buying restrictions, or quotas, were in effect than during periods when such quotas were not operative.

METHOD

Sample

Independent wood-harvesting crews ($N = 379$) working in the southern United States provided the data for this study. Each crew had been harvesting timber for a minimum of 1 year at the time these data were collected.

Procedure

Output rate was measured by dividing the number of cords (each cord, or pile of wood, is 4 feet × 4 feet × 8 feet) delivered by each crew by the total man-hours worked. The possibility that the harvester might alter his men's time reports to increase their income was considered minimal, since the men were paid by him rather than by the company, and they were paid on a piece-rate rather than on an hourly system. The data were collected for three consecutive months: April, May, and June. It was also determined whether a given crew was off quota or on quota for 1 or more weeks during each month.

RESULTS

Since previous studies have shown that month of the year affects output rate, this factor was controlled in the analysis; that is, comparisons were made within, rather than across, months. Thus the data provided three separate tests of the hypothesis, one for each month. For a given month each crew was categorized as having been on or off quotas. A t test was performed on the mean output rate for each group.

The results are shown in Table 1. There was a significant relationship between output per man-hour and buying restrictions, or quotas, for 2 of the 3 months. Workers who could sell as much wood as they could harvest in a given month tended to have lower productivity per man-hour than workers who had quotas.

TABLE 1

MEAN CORDS PER MAN-HOUR AS A FUNCTION OF PURCHASING RESTRICTIONS

Month	Quota	No quota	t
April	.529	.532	.61
SD	.044	.045	
n	117	262	
May	.525	.512	2.61*
SD	.050	.040	
n	137	242	
June	.538	.526	2.82**
SD	.041	.041	
n	163	216	

* $p < .01$.
** $p < .005$.

DISCUSSION

The finding of a significant difference for the months of May and June but not for April may indicate that an adaptation period is required before quota restrictions will affect output rate. Quotas were not common before April, and even during April only 31% of the crews experienced any quotas. Of those crews who had quotas, only 39% had them for more than 2 weeks out of the month. In contrast, 40% of the crews worked under quotas in May and June, and of these, 53% worked under them for 3 or 4 weeks out of the month. Thus, it appears that as more crews are subjected to quotas and work under those quotas for longer periods of time, the quota effect becomes more substantial.

Possible drawbacks in experimental design should be noted. There was no way to determine whether the crews were equal in ability and equipment initially, although all had had at least 1 year of experience. However, there is no reason to believe that the crews with more ability or equipment would have been given more quotas, since these quotas are imposed impartially and equally for harvesters who supply wood to a given mill.

The findings of this study indicate that when paper mills restrict the amount of wood they purchase to fewer days per week, they are implicitly urging a higher production goal (per man-hour) on the harvesting crews. To minimize income loss, the crews must try to harvest as much wood in 1, 2, or 3 days as they formerly harvested in 5 days. Although the quotas may result in lower total output, the rate of production is higher.

These results have both theoretical and practical implications. Theoretically, they demonstrate

the validity of Parkinson's Law in a real work setting. Given the proper incentive, workers adjust their work rate to the time constraints imposed on the task. These findings are in basic agreement with the results of the earlier British studies that found that a reduction in the work week led to a higher hourly rate of production (reported in Ryan, 1947). In addition, the results support F. W. Taylor's (1947) view that piecework incentive systems which are based on reaching a specific hard task or goal yield higher output than piece-rate systems not tied to such goals. Laboratory studies by Locke, Bryan, and Kendall (1968) also support this view. Work crews in the present study were on a piece-rate system at all times, but they still worked faster under shorter time limits than under longer ones.

There are a number of potential applications of these findings. It is possible that the implicit or explicit production goals which the logging crews strive to meet during normal weeks (without quotas) are too low. While the spontaneous use of goal setting by crew supervisors does have beneficial effects (Ronan, Latham, & Kinne, 1973), exposing individuals to formal training in goal setting has been found to yield substantial improvements in productivity (Latham & Baldes, 1975; Latham & Kinne, 1974; Latham & Yukl, 1975). Possibly, the work pace achieved during the weeks when logging crews are on quotas could be adopted as a goal and maintained during normal weeks, thus increasing total productivity and income.

In situations in which increases in productivity are not or can not be accompanied by higher income (e.g., under hourly payment schemes), employees could be offered time off as an incentive for early goal attainment. Completing the work in fewer days would not only allow more leisure time (and a chance to earn extra money in other jobs), but could reduce costs through lowered fuel and maintenance expenses. Recruiting might also be less difficult, and turnover and absenteeism might drop.

The above applications need not, of course, be confined to the logging industry.

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ERRATUM

In the article by Jagdish N. Sheth and A. Marvin Roscoe, Jr., "Impact of Questionnaire Length, Follow-Up Methods, and Geographical Location on Response Rate to a Mail Survey," which appeared in the April 1975 issue (Volume 60) of the *Journal of Applied Psychology,* an error appears in Table 1 on page 253. The third and fourth column headings of the follow-up methods, "Alert and telephone interview" and "Telephone interview," are reversed. Reversing these column headings results in two changes in the text on page 254. In the second paragraph, the second sentence should read, "The results clearly indicated that most of the within-factor variance arose due to the two follow-up procedures of the telephone interview without alert and the telephone reminder. . . ." The fifth sentence of the last paragraph should read, "From the results summarized in Table 1, it is obvious that while telephone reminders were the best follow-up method in terms of overall impact, the postcard reminder was better in the Arizona area and the telephone interview with alert was better in the Fort Worth area."