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Effects of Externally Imposed Deadlines on Subsequent Intrinsic Motivation

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This experiment was designed to explore the effects of externally imposed deadlines on individuals' task performance and their subsequent interest in the task. In two deadline conditions, subjects were given an explicit time limit for solving a series of initially interesting word games. In one condition, the importance of finishing was stated explicitly; in the other condition, the deadline was left implicit. In two control conditions, subjects worked on the puzzles without any explicit time limit. In one condition, subjects were asked to work at their own pace; in the other, they were asked to solve the puzzles as fast as possible. Virtually all subjects finished in the allotted time. Unobtrusive measures of subsequent interest indicated that in the absence of external constraints, subjects in the deadline conditions were less interested in the game than subjects in the nondeadline conditions. The theoretical implications of these findings for the overjustification hypothesis are discussed.

Deadline: a line drawn within or around a prison that a prisoner passes only at the risk of being instantly shot. (Webster's Third New International Dictionary of the English Language, 1966, p. 580)

Although the word *deadline* now refers to time rather than space, and the consequences of going beyond the deadline are no longer quite so severe, its connotative meaning has remained largely unchanged. Deadlines are a pervasive fact of life in American society, exerting coercive power over our allocation of time and our expenditure of effort. We not only have an April 15 deadline for filing tax returns but also a time limit for filing forms to request an extension on the original deadline. Although it is generally accepted that deadlines are often an unavoidable safeguard against procrastination, the external imposition of a deadline may have unintended consequences for future task enjoyment. Insofar as a deadline causes us to see ourselves as extrinsically motivated, we may no longer desire to do something we once enjoyed after we have been forced to do it for the sake of meeting a deadline.

In fact, although the immediate energizing effects of deadlines have been documented by researchers interested in productivity (Arvedson, 1974; Webb, Note 1), relatively little attention has been given to the long-term consequences of deadlines. One such consequence has been studied by Aronson and his colleagues (Aronson & Gerard, 1967; Aronson & Landy, 1967; Landy, McCuen, & Aronson, 1969). Their research has shown that subjects given either an arbitrarily long or short deadline for finishing a task will later judge that particular amount of time to be necessary for completion of the task. While these studies raise a number of interesting issues, some of the most important questions about the long-term effects of externally imposed deadlines have been overlooked: How do deadlines affect subjects' subsequent performance, the quality of their work, or their intrinsic interest in the activity at a later time, when external constraints are no longer present? The present study was designed to test the proposition that, indeed, deadlines may be detrimental to subsequent intrinsic interest.

Recently, a growing body of literature has been concerned with this issue of intrinsic

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motivation and the ways in which external constraints may undermine it. Focusing primarily on the introduction of extrinsic rewards for task performance, these studies (e.g., Deci, 1972; Lepper & Greene, 1975; Lepper, Greene, & Nisbett, 1973) have suggested that when an individual engages in an activity as a means to achieve some external reward, his or her subsequent interest in that activity is likely to be undermined. Clearly, giving an individual a deadline for completion of a task is quite different from offering a tangible reward for engaging in the task. There is one crucial similarity, however; in both cases, it can be said that the individual undertakes the task as a means to accomplishing a specific end. In one case, the end is winning the reward; in the other, it is meeting the deadline. Thus, to the extent that imposing a deadline leads the individual to consider his or her behavior as extrinsically motivated, such a procedure may similarly result in a subsequent decrease in intrinsic interest in the activity performed under that constraint.

To examine this hypothesis, college students were asked to play with five sets of an enjoyable word game under different sets of instructions. In a no-deadline condition, subjects played with the game with no performance requirements or time constraints. Two deadline conditions were run, differing only in the explicitness of the deadline. In both conditions subjects were told they would be allowed to play with the game for 15 minutes, were asked to work as quickly as they could, and were informed that most students could finish the game within that time period. In the implicit-deadline condition, no further instructions were given. In the explicit-deadline condition, however, subjects were additionally told that they were required to finish the game in the time allotted in order for their data to be useful. During the second part of the experimental session, subsequent intrinsic interest in the word game was assessed through both unobtrusive measures of subjects' desire to engage further in the activity and measures of subjects' attitudes toward the activity.

There are, of course, other compelling explanations for the hypothesized effect of deadlines on subsequent intrinsic interest. One might argue that the presence of a deadline causes an individual to feel pressured to work faster, which, in turn, may lead to more fatigue, satiation with the task, or frustration with set-backs. Furthermore, such factors might cause the quality of the individual's performance to deteriorate, and his or her dissatisfaction with that performance may become associated with the task.

To test the viability of these alternative hypotheses, a fourth condition was included. In this work-fast condition, as in the no-deadline condition, subjects were given no time limit or information about the performance of others. As in the two deadline conditions, however, they were asked to work as quickly as they could. If the performance (e.g., speed of working, quality of work) of the subjects in the work-fast condition during the first part of the experiment did not differ from that of the subjects in the two deadline conditions, their failure to show a similar decrement in subsequent intrinsic interest in the task would indicate that the speed-of-work explanations cannot adequately account for any lessened interest shown by the subjects working under the deadline.

It should be noted that the deadline phase of the experimental session was deliberately set at 15 minutes. Extensive pretesting indicated that this time limit would be perceived as a real deadline by subjects in the two deadline conditions but would still allow sufficient time for nondeadline subjects to complete the task. This functionally superfluous deadline was used in order to eliminate possible sources of variance that might arise if a number of subjects failed to finish within the allotted time.

To summarize, the following predictions were made: (a) Subjects in the two deadline conditions would show less subsequent intrinsic interest in the game than subjects in the no-deadline and work-fast conditions; (b) subjects in the explicit-deadline condition would show less intrinsic interest in the game than subjects in the implicit-deadline condition; and (c) although subjects in the work-fast condition would show more subsequent interest in the game than subjects in the deadline conditions, these three conditions were not

expected to differ on measures of immediate performance.

METHOD

Subjects and Procedure

Subjects were 40 male undergraduates at Stanford University recruited to participate for $2 in an experiment on "crossword games."[1] Each subject was greeted in the hall by a male experimenter and escorted into a first experimental room (Room 1). The subject's books, coat, and other belongings were placed in a cabinet, and the subject was asked to sign a standard consent form. The experimenter then introduced him to the crossword game "Ad-Lib" (Milton Bradley Company), in which players try to form crosswords from the letters facing up on a set of 13 dice. Using a prearranged set of examples, the experimenter showed the subject how to build such crosswords. He then explained that the study was concerned with the kinds of crosswords subjects could come up with, using as many of the 13 available letters as possible, in order to test whether such word games were a feasible way of improving vocabulary skills.

In order to compensate for differential familiarity with word games, the subject was provided with a set of hints for using all of the letters, although it was emphasized that the experimenters would consider a crossword complete if at least 11 of the 13 letters were used. The subject was then given 5 minutes to toss his own letters and practice forming crosswords. During this time the experimenter answered any questions the subject raised and pointed out any rule violations or mistakes he had made in forming crosswords.

Following this warm-up period, the practice sets were removed and the subject was moved to a second table, located in front of a one-way mirror covered by a bamboo curtain. On this table were five prearranged sets of Ad-Lib letters (each set concealed by a cardboard cover), a clock, and a cassette tape player. The subject was told that prerecorded instructions would explain what he should do during the experimental session. The experimenter turned on the tape player, left the subject in Room 1, and quietly entered Room 2, where he could observe the subject through the one-way mirror. The experimenter was not aware of which tape had been selected for that subject, and he could not hear the instructions while observing the subject from Room 2. This procedure ensured that the experimenter remained blind to the subject's condition until the post-experimental debriefing.

Deadline manipulations. The subject heard one of four sets of instructions, as determined by a random schedule. Each subject was told that the experimenter would like him to try to form crosswords with the prearranged sets of Ad-Lib letters, and he was cautioned not to change any of the letters in those sets. Following this general introduction, the instructions to the subject diverged to produce the four treatment conditions. In the first (no-deadline) condition, the subject was told that he would not be required to work with all five sets of letters; rather, he was told to play with the crossword games only as much as he wished. In the work-fast condition, the subject was asked to work as fast as he could on each of the five sets and to try to use at least 11 of the 13 letters in each set. As in the no-deadline condition, the subject was not given any information on the amount of time he would have available for working at this task. In the implicit-deadline condition, the subject was also asked to work as fast as he could on each of the five sets of letters and to try to use at least 11 of the 13 letters in each set. In addition, the subject was informed that he would have 15 minutes to work at this task, a time period which had proved sufficient for most Stanford students to complete the task. Subjects in the explicit-deadline condition received instructions identical to those for the implicit-deadline condition, with an additional explicit stricture that the subjects must complete all five sets within the allotted time period for their data to be of any use in the experiment.

At the end of the tape, all subjects were told that they should feel free to relax and look through a set of magazines on a nearby table if they had time before the experimenter returned. At the conclusion of the instructions, the subject was asked to turn off the tape player and begin working on the puzzles. When the subject turned off the tape player, the experimenter, sitting in Room 2, proceeded to record the amount of time the subject spent with each of the five sets of letters. Subjects in all conditions were given 15 minutes to work with the Ad-Lib sets; all subjects who finished early did spend the remainder of the 15 minutes looking through the magazines that had been set out. At the end of this period, the experimenter returned to Room 1 and recorded the subject's crosswords.[2]

Measurement of intrinsic interest. The experimenter then explained to the subject that scheduling constraints made it necessary to move him to another room to fill out a questionnaire on the experiment. The subject was escorted to Room 2, which was filled with equipment and boxes to give it the appearance of being a storage area. The subject was seated at a table next to a concealed one-way mirror.

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[1] Post-experimental debriefing revealed that six subjects were suspicious of the true purpose of the experiment: three in the no-deadline condition, one in the work-fast condition, and two in the implicit-deadline condition. These subjects were replaced.

[2] It was noted earlier that the 15-minute deadline was chosen so that it would appear to be a realistic challenge to deadline subjects yet would allow control subjects enough time to complete the task. In fact, only five subjects, two each in the no-deadline and work-fast conditions and one in the implicit-deadline condition, failed to complete all five crossword sets within the allotted time. Since virtually all subjects completed the task (whether given a time limit or not), the deadline itself was, as intended, functionally superfluous.

On the table in front of him was a set of Ad-Lib cubes and blocks from a "Soma-Cube" puzzle (Skor-Mor Corporation), which extensive pretesting had revealed to be of approximately equal initial interest to subjects.

The experimenter took the subject's questionnaire out of its envelope and as he explained the instructions to the subject, he discovered that the second page of the questionnaire was totally illegible. The experimenter then "decided" he should get another copy of the questionnaire and asked the subject to sit and relax while he went down to the basement of the building to get one. In fact, the experimenter surreptitiously returned to Room 1 and observed the subject for a period of 15 minutes, recording the amount of time he spent with the Ad-Lib and the Soma-Cube games. At the end of 15 minutes, the experimenter returned to Room 2 with a fresh copy of the questionnaire, which the subject then filled out.

The questionnaire included a number of questions designed to assess the subject's intrinsic interest in the Ad-Lib game. The subject was asked whether he would be willing to participate without pay in future experiments involving the game and whether he viewed the game as work or leisure activity. He was also asked to indicate how much satisfaction he received from the game and how much he had enjoyed playing with it. Finally, the subject was asked whether his play with the game during the experimental session was intrinsically or extrinsically motivated.

Upon completion of the questionnaire, the subject was probed for suspicions concerning the true purpose of the experiment. Each subject was then exposed to a thorough debriefing concerning the true purposes of the experiment and the necessity for the deception involved. All subjects appeared interested in the experiment and its potential implications, and they expressed no negative feelings about the deception or participation in the experiment.

Results

Three sets of dependent measures were collected: (a) behavioral measures of subsequent intrinsic interest in the task during the free-time situation which followed the deadline period, (b) attitudinal measures of intrinsic interest in the task collected at the end of the experiment, and (c) performance measures assessing the speed and quality of subjects' work during the deadline period. The data from each of these measures will be considered, in turn, with respect to the experimental hypotheses.

Behavioral Measures of Subsequent Intrinsic Interest

Of primary interest in this study was the amount of time subjects would choose to spend playing with the Ad-Lib game during the subsequent free-time period when they believed that their behavior was no longer being monitored. The mean time spent with the Ad-Lib game in each condition, presented as a percentage of the total 15-minute period available, is presented as the first item in Table 1.

TABLE 1

Mean Subsequent Intrinsic Interest in the Task, on Behavioral and Attitudinal Measures, by Condition

Intrinsic interest	Experimental condition			
	No deadline	Work fast	Implicit deadline	Explicit deadline
Mean percent of free-choice time spent with task	62.34	54.16	32.98	24.48
Mean summed ratings of task interest	1.86	1.62	−.13	−1.94

Note. $n = 10$ subjects per cell.

To test the hypothesis that imposition of an externally imposed deadline would decrease the likelihood that subjects would subsequently choose to engage in the activity in the absence of external constraints, a planned contrast comparing the two deadline conditions to the two nondeadline conditions was performed. This contrast proved to be significant, $F(1, 36) = 6.46$, $p < .025$, accounting for most of the systematic treatment variance. However, a second planned comparison between the two deadline conditions, to test the hypothesis that subsequent interest would be more adversely affected by an explicit deadline, failed to approach significance ($F < 1$).

The same decrease in interest among subjects in the deadline conditions is also apparent if the data are viewed nonparametrically, indicating that the effect does not seem to be the result of a small number of extreme cases. A median split performed on the amount of time subjects chose to engage in the task indicated that 65% of the subjects in the nondeadline conditions fell above the median, while only 35% of the subjects in the two deadline conditions fell above the median in interest. This difference between the two

deadline and nondeadline groups is significant by Fisher's exact test ($p = .05$).[3]

Finally, a similar pattern of results was apparent in terms of the game subjects first chose to play with after they had been left alone. Of subjects in the nondeadline groups, 60% played first with the Ad-Lib game; in the two deadline conditions, only 20% chose to play first with Ad-Lib. Again, this difference is significant by Fisher's exact test ($p = .04$).

Attitudinal Measures of Interest

In order to investigate the relationship between behavioral measures and verbal reports of interest in the game, subjects were later asked to complete a brief questionnaire which contained five questions designed to measure subjects' enjoyment of and interest in the Ad-Lib game. From these questions a single measure of interest was obtained for each subject by normalizing the responses to each particular question and summing the five z scores for each subject.

The mean ratings of interest in the task obtained by this procedure are presented as the second item in Table 1, where it is apparent that the results of these attitude measures closely parallel those obtained on the behavioral measures of interest. Again, a planned comparison assessing the difference in interest between the deadline and nondeadline conditions proved significant, $F(1, 36) = 11.96$, $p < .025$. As before, the contrast between the two deadline conditions did not approach significance ($F < 1$).

As might be expected from these results, this overall attitude measure was significantly correlated with the previous behavioral measure, $r(38) = .40$, $p < .05$. Not surprisingly, each of the five component questions which entered into this overall attitude measure also correlated positively with the amount of time subjects chose to play with the game, though only three of these correlations—willingness to participate in future Ad-Lib experiments without pay, perceived satisfaction while doing the Ad-Lib task, and perceived enjoyment of the Ad-Lib task—were individually statistically significant.

Performance Measures During the Deadline Period

To examine possible differences in the quality of subjects' performances during the initial part of the experimental session, several qualitative performance indices were examined. Measures of the average length of words formed in subjects' crosswords, the mean number of letters included in subjects' crosswords, and the number of misspellings or other errors, for example, were subjected to a series of analyses of variance. In none of these cases was there any significant effect of the experimental treatments on the quality of subjects' performance.

Since subjects in all conditions seemed to demonstrate an equivalent proficiency in their use of the Ad-Lib game during the experimental period, it is possible to compare the amount of time subjects required to complete the five crossword sets. A one-way analysis of variance performed on these time data yielded a significant treatment effect, $F(3, 36) = 4.09$, $p < .05$. Not surprisingly, a considerable portion of this systematic treatment variance is accounted for by the longer times taken by subjects in the no-deadline condition ($M = 13.5$ min.) who had been told to work at their own speed, compared with subjects in the work-fast condition ($M = 11.7$ min.) and the two deadline conditions ($M = 10.5$ min.) who all had been asked to complete the five crosswords as quickly as they could, $F(1, 36) = 7.99$, $p < .01$.

Of greater potential interest, however, is the comparison between the work-fast and the two deadline conditions. Comparing only the work-fast condition with the two deadline groups on the amount of time needed to complete the crosswords produced no evidence of performance differences during the deadline period, $F(1, 27) = 1.27$, *ns*. However, a similar comparison between the work-fast condition and the two deadline groups did yield a significant effect on the attitudinal measure of intrinsic interest, $F(1, 27) = 7.26$, $p < .025$, and a nearly significant effect on the behavioral measure of intrinsic interest, $F(1, 27) = 3.89$, $p < .06$. These data would appear to

[3] All p values reported in this paper are based on two-tailed tests of significance.

indicate that performance differences during the initial part of the experimental session were not a necessary precondition for subsequent decrements in interest shown by subjects in the two deadline conditions.

Discussion

This study demonstrates that an externally imposed deadline for completion of a task can result in a decrement in subsequent intrinsic interest in that task. Compared with subjects in the two no-deadline conditions, subjects in both deadline conditions showed a marked decrease in interest that was evident in unobtrusive behavioral measures as well as attitudinal measures of interest. Thus, this study provides additional support for the "overjustification" hypothesis (cf. Lepper et al., 1973), which suggests that imposition of a means–end relationship between an activity and an external constraint may undermine intrinsic interest in that activity.

There are a number of other explanations that could be offered for the decreased intrinsic interest of subjects in the two deadline conditions, but these are not supported by the data. First, it could be argued that the pressure of working quickly may have consequences (e.g., greater fatigue, satiation, dissatisfaction with performance, frustration caused by setbacks) that could lead to a subsequent decline in interest. It will be recalled, however, that while the level of interest shown by subjects in the work-fast condition was higher than that shown by subjects in the two deadline conditions, there were no performance differences in the time spent or the quality of subjects' work across these three conditions. The data, therefore, provide no evidence to support this class of alternative explanations.

Second, it might be argued that subjects were responding on the basis of their inferences regarding the experimenter's own interest in the task. In other words, his imposition of a deadline might communicate to the subjects that he found the task to be aversive. To examine this possibility, one item on the questionnaire asked subjects to judge how enjoyable the experimenter considered the Ad-Lib game to be. Since there were no significant differences in response across the no-deadline ($M = 9.7$), work-fast ($M = 7.7$), and deadline ($M = 7.4$) conditions, however, this explanation receives no support from the data.

Finally, it could have been argued that subjects in either the no-deadline or work-fast conditions would be more willing to play with the game later because of their failure to complete the word games during the initial experimental session (a type of Zeigarnik effect). Since virtually all subjects finished the game within the allotted time, this potential explanation has little merit.

It seems, then, that the overjustification hypothesis provides the best explanation of the data. Previous research (Lepper et al., 1973; Deci, 1972) has typically studied the effect of tangible rewards on intrinsic motivation, but the present study shows that the extrinsic goal or end need not be tangible to result in a subsequent decrease in intrinsic interest. It appears that simply engaging in an activity in order to achieve something as abstract as "meeting the deadline" can produce the same effect. Other research (Lepper & Greene, 1976) has shown that other external constraints, such as overt surveillance over an activity, can similarly undermine future interest in that activity. Thus, the perception of the external constraint itself, rather than the particular form of constraint, appears to be the critical variable. In an important sense, it is the psychology of extrinsic constraints—rather than the psychology of rewards, deadlines, or surveillance—which is illuminated by these studies.

Whereas the data provided significant support for the hypothesis that subsequent intrinsic interest in the activity would be less for subjects undertaking the task under an externally imposed deadline compared with subjects undertaking the task in the absence of such a constraint, the results failed to reveal an expected difference between the two deadline conditions. Although subjects in the explicit-deadline condition appeared to show less intrinsic interest in the task than the implicit-deadline subjects on each of the measures of subsequent interest, none of these comparisons approached statistical significance. Whether this lack of difference between the two deadline procedures is a reflection of

a "floor effect" in the measures of subsequent interest, the relatively small differences in those procedures, or the all-or-none nature of attributions of intrinsic versus extrinsic motivation awaits further empirical research.

Of course, whether the imposition of any particular deadline will have positive or negative effects on later intrinsic interest in the activity will obviously depend on a number of factors in addition to those specifically examined in the present study (e.g., the individual's initial skills and interests), as well as the context in which the deadline is presented (cf. Lepper & Greene, 1976). Undoubtedly, deadlines frequently serve a useful function; employed to excess, however, they may also prove ultimately dysfunctional and even self-perpetuating. The constructive implementation of deadlines, then, will require a sensitivity to both their immediate and their subsequent consequences.

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