[Proceedings of the Iowa Academy of Science](https://scholarworks.uni.edu/pias)

Volume 59 | Annual Issue Article 44

1952

The Effect of Initial Massing of Practice on the Transfer Task in a Proactive Interference Situation

Abram M. Barch
State University of Iowa

The Effect of Initial Massing of Practice on the Transfer Task in a Proactive Interference Situation

By Abram M. Barch

Virtually all motor learning studies have shown spaced practice to be superior to massed practice. Most of the apparent exceptions, such as the work of Cook, involve tasks in which symbolic responses play a dominant role—such tasks as spider mazes, punch board mazes, mechanical puzzles, etc. (1, 2). The few remaining exceptions are studies in which the term "spaced practice" is a misnomer. That is, the performance of the so-called "spaced" groups was affected as much by the inhibitory effects of work decrement as was the performance of the massed practice groups (3).

If motor learning is regarded as the learning of responses which involve a minimum of symbolic behavior the general superiority of well-distributed practice in the past motor learning studies must be conceded. The question may still be asked whether there exists any motor learning situation in which the massing of practice would be advantageous.

In simpler forms of learning, such as conditioning and trial and error learning with animals, distributed practice has been found superior to massed practice for the acquisition of a habit. Massing of trials, however, gave the most rapid extinction.

Generalizing from these results to motor learning it would appear that the best way to eliminate an unwanted or inappropriate response would be to give it massed, unreinforced practice.

In a proactive interference situation the subject first learns one task on a motor device and then learns a transfer task in which some of most of the response tendencies acquired in the initial task are inappropriate. These "old" response tendencies are not only inappropriate but may elicit responses that are antagonistic to the now appropriate responses. For example, on the initial task the response to a stimulus at a given point in space might have been an upward movement of the control; on the transfer task the appropriate response to that stimulus might now be a downward movement of the control. Thus, the subject in learning the transfer task must unlearn, eliminate, or inhibit in some way the antagonistic response tendencies so that the appropriate responses will have a chance to appear and be learned.

If this elimination of inappropriate response tendencies can be regarded as being akin to an extinction process, it would seem that massing of practice during the initial portion of the transfer task would accelerate this elimination or inhibition process. As soon as the appropriate responses begin to appear to any great extent, it would be necessary to change the spaced practice in order to allow for the best learning of the appropriate response tendencies.

Applying the previous reasoning to an experimental situation, the following prediction can be made:

Initial massing on the transfer task in a proactive interference situation followed by spaced practice should lead to better learning of the transfer task than spaced practice throughout the transfer task.

Experimental Design and Procedure

Twenty-two college male volunteers from an introductory psychology course participated in the experiment.

The Iowa model of the Turret apparatus had given large and reliable amounts of proactive interference in previous studies and was selected for use in the experiment. Since a complete description of the apparatus is available elsewhere (4), only the essentials will be described. The subject sits in a turret whose movements are controlled by the movements of pistol-grip type controls. When the turret is moved, a light beam fixed to the front of the turret is also moved. The subject attempts to line up this light beam with a photoelectric cell (the target). The cell is mounted at the end of a long boom. Movements of the boom produce the pursuit pattern. The same pusuit pattern is presented for every trial.

Two arrangements of control-display relationships were utilized. The Standard control settings presented the relations between the controls and the display in the expected or "normal" manner. For example, pulling the handles up moved the light down. Pushing forward with the right hand and pulling back with the left moved the light to the left. The Reversed control settings were the reversal of these relations. For example, pulling the handles up moved the light up.

The preferred experimental design was one in which the subjects were first trained on the Standard task and then tested on the Reversed task. With this arrangement the tendency to make appropriate responses on the transfer task could be expected to be quite low. Unfortunately data from a previous study (4) indicated that the distribution of scores on the early trials of the Reversed task would be strongly skewed toward zero and contain a number of zero scores. Therefore, it was decided to train on the Reversed task and test on the Standard task in order to obtain scores on the test trials that would be amenable to statistical tests making an assumption of normality of distribution.

Trials were always 30 secs. in length. Three distributions of practice were used. Standard practice presented 30 secs. work—30 secs. rest. Massed practice presented 30 secs. work—0 secs. rest. Spaced practice presented 30 sec. work—60 secs. rest.

For the best results the massing of practice was to be terminated when the appropriate responses began to appear. Inspection of the data from a previous study (4) showed that the subjects began getting on target at about the eleventh trial or after five minutes of actual practice on the transfer task. During the running of the experiment this amount of initial massing appeared to be too great, and another group with a lesser amount of massing was added.

Table 1

Conditions of Practice

Group	n	Days 1	Reversed Task 2	3	Standard Task
X-1	8	40 Trials	47 Trials	3 Trials	10 Massed 20 Spaced Trials
X-2	6	40 Trials	47 Trials	3 Trials	4 Massed 26 Spaced Trials
C	8	40 Trials	47 Trials	3 Trials	30 Spaced Trials

The experimental design is shown in Table 1. There were two experimental groups and one control group. All groups practiced 90 trials of the Reversed task under standard distribution of work and rest. The last three trials of Reversed practice were given at the start of the practice period on Day 3 of the experiment. A two minute rest was then taken in which the controls were reversed, the timing of the rest intervals was changed, and the subjects were informed of the various changes. The first experimental group (Group X-1) was given five minutes of massed practice on the Stan-

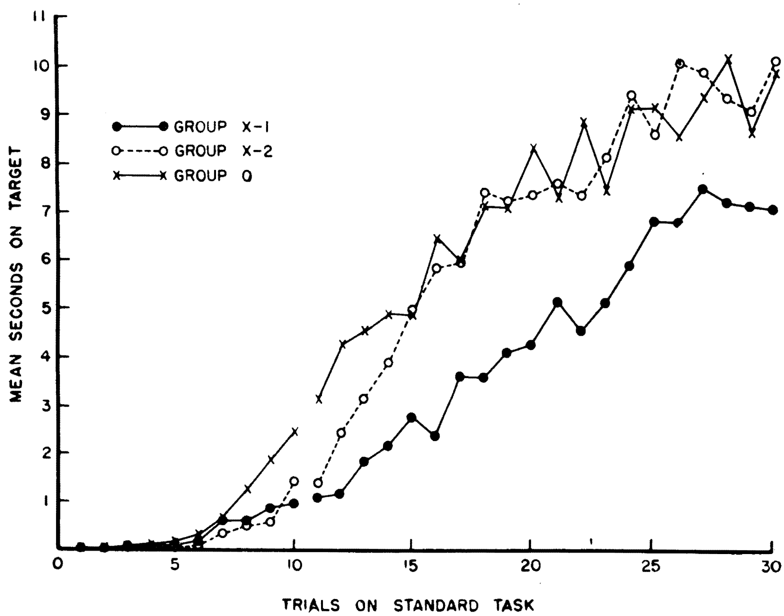

Figure 1. Mean time on target for all groups during the test trials.

dard task and then switched to spaced practice. The second experimental group (Group X-2) was given two minutes of massed practice and then switched to spaced practice. The control group (Group C) practiced the Standard task under spaced conditions only.

All groups were given a six minute rest between the tenth and the eleventh trial of the Standard task.

Results

An analysis of variance was performed using the last three trials of Reversed practice. The value of the *F* that was obtained was less than 1.0. Therefore, it was assumed that the hypothesis of random sampling from a common population could not be rejected.

Figure 1 presents the time on target curves for the three groups during the 30 test trials on the Standard task. The control group gave the best performance. Group X-2 was intermediate in performance at first but soon caught up with the control group. Group X-1 gave the worst performance of the three groups.

An analysis of variance was performed using each subject's total score on the 30 Standard task trials as the individual measures. The value of the *F* obtained (1.96 for 2 and 19 d.f.) was not significant at the .05 level. Thus, although Group C tended to give a superior performance, the difference was not significant.

Discussion

The results gave no support to the experimental hypothesis. In fact, the trend was in the opposite direction. Since, however, the trend was not significant, it can not be said that the hypothesis was definitely contradicted. Initial massing of a transfer task in a proactive interference situation did not aid in the learning of the transfer task.

One can ask, however, if the condition required for a successful test of the hypothesis have been met. Did a considerable amount of unlearning or inhibition have to occur before the appropriate responses began to appear and be learned? Observation of the performance of the subjects during the first few trials of the Standard task indicated many general movements in the direction of the target. The movements were usually not extensive enough or rapid enough to catch up with the target, but they were decidedly appropriate responses. Furthermore, later studies with a similar motor device indicate that subjects, even in the presence of the strongest proactive interference, spend only a little more than half of the time moving in a direction opposite to that of the target. Thus, the initial massing of practice on the transfer task probably served not only to inhibit the inappropriate responses but also the appropriate ones. The greater the massing, the greater was the inhibition.

In order to adequately test this hypothesis of the advantage of initial massing of practice in an interference situation it will probably be necessary to use a situation in which the transfer task requires responses that are unknown to the subject. That is, the motor device to be used must be one that will provide strong "inappropriate" response tendencies, and there must be a lack of specific verbal knowledge as to the correct response or sequence of responses. This situation is similar to a mechanical puzzle situation and may explain some of Cook's results.

Conclusions

1. Initial massing followed by spacing of practice on the transfer task in a proactive interference situation failed to yield performance superior to that of a group that practiced the transfer task with spaced practice throughout.

2. Analysis of the learning situation indicates that an adequate test of the hypothesis would probably require a situation in which the subject did not know the "correct" responses on the transfer task.

Bibliography

1. Cook, T. W. Massed and distributed practice in puzzle solving. Psychol. Rev.: 41: 330-355.
2. Cook, T. W. Factors in massed and distributed practice. J. exp. Psychol.: 34: 325-334.
3. Franklin, J. C. and Brojek, J. The relation between distribution of practice and learning efficiency in psychomotor performance. J. exp. Psychol.: 37: 16-24.
4. Shephard, A. H. and Lewis, D. Prior learning as a factor in shaping performance curves. U. S. Navy, Office of Naval Research, Technical Report SDC 938-1-4, 1950.

DEPARTMENT OF PSYCHOLOGY
STATE UNIVERSITY OF IOWA
IOWA CITY, IOWA