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REMEMBERING TO RECALL IN EVERYDAY LIFE: AN APPROACH TO ABSENT-MINDEDNESS

A. J. Wilkins and A. D. Baddeley
MRC Applied Psychology Unit, 15 Chaucer Road, Cambridge, England

ABSTRACT

Two groups of subjects, one with high and one with low free recall scores, were instructed to operate a miniature print-out clock at pre-arranged times, four times a day for a week. Their accuracy at operating the clock was inversely related to their free recall scores. If subjects operated the clock they remembered that they had done so, whereas if they forgot to operate it they often appeared to be unaware of their omission.

INTRODUCTION

Ebbinghaus, one of the pioneers in the study of human memory, required his subject first to learn artificial material, and afterwards to recall that material at some specific time. Subsequent work has shown a trend away from the artificiality of this approach. This trend has involved not only changes in the materials that are learned (words instead of nonsense syllables), but also the means whereby they are learned. The studies of incidental learning (Hyde and Jenkins, 1969), semantic memory (Collins and Quillian, 1969) and memory for newsworthy events (Warrington and Sanders, 1971) provide examples of this trend. In the case of semantic memory research, for instance, naturalistic information is learned in the real world and the experimenter has no control over its acquisition. Instead it is the processes of recall that are of paramount interest. In the present study, which is also concerned with the processes of recall, the break with the Ebbinghaus tradition has been carried one stage further.

Most, if not all, studies of memory have in common with the work by Ebbinghaus the fact that the experimenter has had control over the subject's recall; the subject has been required to recall at the experimenter's request rather than

at a time when he would normally do so.

This "prompted recall" rarely occurs in everyday memory which, as the work by Harris (this volume) has shown, usually involves the person remembering to do something at a particular time, or at some particular point in the sequence of everyday events. Consider, for example, the task of taking medication at scheduled times each day. This task is typical of many everyday memory tasks in that a person has to provide his own cues for recall. It is also simpler than most memory tasks in that the person has nothing to recall other than that he must take his medication. The recalled information is minimal - it is the time of recall that is critical. The task therefore seemed an appropriate one with which to begin a study of self-cued memory.

We used an analogue of a pill-taking task in which, rather than taking pills, subjects were required to operate a miniature print-out clock at pre-arranged times. We gave the task to two groups of subjects, one with high scores on a test of free recall and the other with low, in order to see whether subject-cued recall was related in any way to memory as measured in the laboratory. We chose free recall of lists of words because (1) this is a very widely used laboratory test of memory, (2) its theoretical basis has received considerable study, (3) the task is a sensitive indicator of disorders of memory such as amnesia (Baddeley and Warrington, 1970), and (4) performance of other tests of memory correlates with performance at free recall (unpublished data).

METHOD

Subjects. Thirty-one female volunteers from the Applied Psychology Unit subject panel aged between 35 and 49, who had taken part in a study of individual differences in memory, were selected on the basis of their scores on a test of free recall of lists of words. The test consisted of 10 lists, each of 16 two-syllable words presented visually for one second with a one-second interval between words. Subjects were instructed to write down the last few words first but recall order was otherwise unrestricted. Recall was immediate. The recall scores ranged from 29/160 to 98/160 in the sample of 100 subjects tested, with a mean of 62.2 and a standard deviation of 12.5. Of those subjects in the sample who were available for subsequent testing, the 16 with the highest scores comprised a high free recall group with percentile scores in the range 72-99 (mean percent correct = 49%); the 15 subjects with the lowest scores formed a low free recall group with percentile scores from 4 - 40

(mean percent correct = 31%).

Apparatus. A circuit board from an electronic wrist-watch with light-emitting diode display (CBM Business Machines Ltd.) was mounted in a fibreglass block moulded to fit between the spools of a Kodak "Instamatic" cartridge so as to prevent light reaching the surface of the film. Sandwiched between the surface of the light-emitting diodes and the surface of the film was a filter with a neutral density of about 3.0. The ensemble fitted within a plastic box measuring 11 x 6 x 3 cm and weighing 150 gm. In one of the 11 x 3 cm sides of the box were mounted side by side a knob which could be used to advance the film from one spool to the other, and a push-button switch which activated the watch circuit thereby exposing the film and creating a photographic record of the time of day at which the button was pushed. A label beneath the controls bore instructions as to how and when to operate the machine. Another label attached to the 11 x 6 cm side of the box carried the request "Please record omissions" and had three vertical columns headed "date", "time" and "comment" in that order.

Procedure. The subject was given the print-out clock and shown how to operate it by turning the knob and pushing the button. She was asked to operate the clock at 8.30 a.m., 1.00 p.m., 5.30 p.m. and 10.00 p.m. (the times shown on the label attached to the clock) each day for seven days. The subject was instructed that if she forgot to push the button at the target time she should push it as soon as she remembered. If she failed to remember before the next response was due she should make a note of this "omission" on the label attached to the clock and respond to the subsequent target as normal. She was then given concrete examples to clarify these instructions. Nine subjects in the high free recall group and eight in the low began the task on a Monday. The remaining subjects began on a Friday. All subjects started between 8.30 a.m. and 5.30 p.m.

RESULTS

From the sequence of response times recorded by the clock there was, of course, no way of telling to which target time a response should be allocated, other than that (1) the response occurred at a time similar to that of the target, and (2) the putative responses to neighbouring targets also occurred at appropriate times. Fortunately, the histogram of response densities as a function of time showed

four distributions with virtually no overlap, and with peaks 4½ hours apart corresponding to the target times. The distributions were therefore superimposed, and the resulting distribution is shown in Fig. 1. Responses occurring from 2½ hours before to 2½ hours after a target time were allocated to that target time unless this allocation conflicted

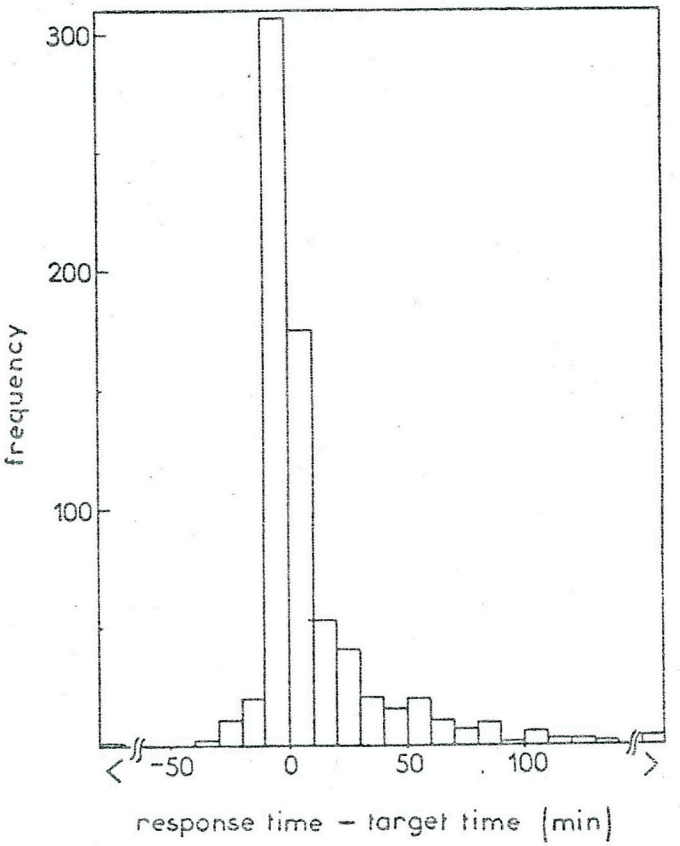

Fig. 1 Distribution of the differences between response times and target times.

with that based on the ordinal position of the response with respect to neighbouring targets (which it did in only two instances). The above treatment of the data begs the question as to whether on some occasions subjects responded more than once to a target. However, no subject ever responded more than four times in one day, so that if multiple responses did in fact occur, they would have had to have been only on those occasions when subjects omitted a subsequent response. Given that omissions (as attested by responses to neighbouring targets) comprised only 3.6% of observations, it may reasonably be assumed that there were few, if any, multiple responses to a single target.

There was some difficulty in selecting the measure most suitable as an index of subjects' performance of the task. Late responses may well have been the direct result of absent-mindedness, whereas early responses are unlikely to have been so. Given that there is such a functional dichotomy it would have made sense to attempt to analyse early responses separately from late ones. Unfortunately, what was "early" or "late" *for the subject* depended on the time-check the subject used: whether she wore a watch at the time, and if so, whether it happened to be running fast or slow, for example. In other words, there was no criterion on the basis of which to distinguish early responses from late ones, except, perhaps in the more extreme cases. Given that any separation of extreme cases would have been arbitrary, it made more sense to treat all responses on a single continuum: that which forms the basis of the distribution shown in Fig. 1.

An analysis of variance of the differences between target and response time was performed with the following factors: subject group (high or low free recall), target time (8.30 a.m., 1.00 p.m., 5.30 p.m. and 10.00 p.m.), day of task (1st - 7th) and day of commencement (Monday, Friday). The analysis revealed a significant effect of subject group, $F(1,26) = 5.88$, $p < 0.05$, a significant effect of target time $F(3,78) = 3.23$, $p < 0.05$, and a significant effect of day of task, $F(6,154) = 2.56$, $p < 0.05$. The effect of day of commencement and the interaction terms were not significant.

The absence of a significant interaction between day of task and day of commencement indicated that there was no effect of the day of the week (e.g. weekdays vs. weekends). Newman-Keuls tests of the scores for the four target times revealed that subjects were more accurate at 8.30 a.m. than they were at 1.00 p.m. and 5.30 p.m. (The accuracy of performance at 10.00 p.m. did not differ from that for the other three target times). Newman-Keuls tests for performance on

the seven days of the task failed to reveal any significant differences between days despite the significant F-ratio in the analysis of variance.

Table 1

Mean differences between response time and target time (in minutes late).

Subject group	Target time			
	8.30 am	1.00 pm	5.30 pm	10.00 pm
High free recall	6.2	16.0	19.5	11.1
Low free recall	4.4	10.3	8.1	8.7

Table 1 shows the relevant means and it will be noted that the effect of subject group arose because subjects with high free recall scores performed more poorly than those with low.

There were a total of 30 failures to respond to a target, and 15 of the 31 subjects failed to respond at least once during the week. Only 19 of the 30 failures were acknowledged and eight of the 15 subjects failed to acknowledge an omission on one or more occasions. There was no significant difference between subject groups in the number or type of omissions.

DISCUSSION

Subjects with high free recall scores responded less accurately at the pre-arranged times than those with lower scores. This result was not anticipated. It was thought that performance would be more likely to be related to motivational factors; obsessional subjects who frequently looked at their watches tending to perform more accurately. Given the likely contribution of such factors to experimental noise no effect of free recall ability had been anticipated. Indeed this was why the groups were formed from the extremes of the distribution of free recall scores so as to maximise the likelihood of revealing any effect. The fact than an effect occurred and that it was in the direction opposite to that which might be expected from a simple notion of memory ability is open to many competing speculative interpretations. One possibility is that a subject's life-style provided cues for recall; subjects with high free recall scores tending to

have a higher educational level and to lead more varied lives. This interpretation is consistent with the fact that performance was best at 8.30 a.m. when people tend to do fairly humdrum things that are similar from one day to the next. To see whether life-style was a contributory factor, subjects were asked to keep a diary for a period of a week about six months after they had taken part in the first experiment. The 23 subjects who were available for testing were issued with a sheet of paper bearing labelled sections for the four target times for each of the seven days of the week, starting on a Monday or a Friday, as appropriate to the conditions of the first experiment. The subjects were asked to note down at the end of each day, in the space provided, the activity in which they had been engaged at these particular times. The diaries were scored by (1) noting the number of activities repeatedly performed at similar times, and (2) noting for each target time the number of occasions during the week that the subject was away from home. These measures were used as covariates in analyses of covariance of the data from the earlier experiment with target time and subject group as separate factors. The effect of time of day was significant for both covariates but using these to adjust the original analysis did not affect the overall picture. Evidently if life-style is an important factor in self-cued recall, more sensitive measures are needed to pick up its effects. At this stage further speculation as to the reason for the difference between the two subject groups is unlikely to be productive. The only firm conclusion that can be made is the rather obvious one that far more factors are involved in everyday memory than those measured in the laboratory. It is nevertheless rather intriguing that the present results seem to support the myth that absent-minded persons tend to be those with high educational level.

An aspect of the data that is perhaps more interesting is the fact that 30% of the subjects forgot to push the button on one or more occasions *of which they were apparently unaware*. As many as 36% of all omissions were not acknowledged by subjects. This result might be readily interpretable as a lack of motivation in reporting failures, rather than an unawareness of these failures, were it not for the fact that subjects appeared to be quite diligent about reporting any responses that they deemed inappropriate. Many late responses were acknowledged as being late, despite the instruction only to record omissions. Apparently subjects simply forgot they had omitted a response. This forgetting was obtained despite the fact that subjects rarely, if ever, forgot that they had pushed the button if they had in fact done so:

there were very few (if any) multiple responses to a single target, and subjects never acknowledged an omission when one had not in fact occurred. The data seem to suggest that if a subject responded she remembered that she had done so, whereas if she forgot to do so she often failed to remember her omission. This bias, if it is real, is difficult to explain in terms of proactive interference between traces of earlier responses. Whatever its explanation, the bias has obvious relevance for the everyday task of taking a pill, in that it stresses the importance of pill boxes which enable a day's or a week's dose to be placed in labelled compartments so that a patient can easily tell whether or not a pill has been taken (cf. the packaging of the contraceptive pill).

The findings of the present experiments have two implications for the study of memory. First, laboratory tasks may generalise rather poorly to the real world because of the way in which the experimenter cues recall. Second, studies of memory that rely on subjects reporting their failures to recall (e.g. Reason, 1976) may miss a substantial proportion of failures of which subjects are apparently unaware.

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