

Notes and Comment

A comment on primacy effects in monkeys' memory for lists

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Two recent experiments (Roberts & Kraemer, 1981; Sands & Wright, 1980a, 1980b) are of potential theoretical importance because they demonstrate in monkeys a primacy effect in probe recognition memory.

A primacy effect is a general feature of human verbal memory, and its general absence both in human nonverbal memory and in monkeys' memory has been one of the grounds for believing that memory processes and mechanisms in monkeys are analogous to at least the nonverbal part of human memory (Gaffan, 1977a, 1977b, 1977c). However, the two recent demonstrations of results contrary to this pattern need to be considered in a broad context, perhaps broader than that indicated in the reports themselves. In the first place, primacy effects may arise for a number of different reasons in different tasks, and it is necessary to inquire in each case what the probable causes are before correct analogies with other tasks can be drawn. In the second place, there is no reason to restrict discussion to the probe recognition task. There are other adequate methods of assessing serial-position effects with monkeys (Gaffan & Weiskrantz, 1980), while in man, as has already been noted, the primacy effect is by no means restricted to probe recognition, which as it happens is one of the few techniques that under some conditions reveal flat serial-position functions in human verbal memory (Gaffan, 1977a; Sternberg, 1975).

Roberts and Kraemer (1981) conclude that their results and those of Sands and Wright "suggest that the primacy effect may be characteristic of primate memory in general" (p. 593). At the purely empirical level, the validity of this suggestion is questionable. No primacy effect was observed in monkeys' recognition memory by Gaffan (1977c) or by Gaffan and Weiskrantz (1980, Experiment 1, stages 7 and 8) or in recall by Gaffan (1979, Experiment 4, stage 7). It may be helpful, therefore, to consider the differences in procedure between the two groups of experiments.

Roberts and Kraemer required an acquisition list to be initiated by the monkey with a series of keypresses; when this series was completed, the first item

of the list appeared, and the remainder of the list was subsequently presented at regular intervals without any further response requirement. Holding down a lever played a similar role in the experiment of Sands and Wright. In this procedure, items at the beginning of the list have two attentional advantages over subsequent items: they are presented immediately after the monkey has, by its behavior, demonstrated a readiness for the next list and an attentiveness to the task, which may lapse sometimes during the presentation of the list; and they are themselves the signal for a response from the monkey, namely the cessation of the sequence of keypresses or the release of the lever. However, in the procedure of the second group of experiments (those which demonstrated no primacy effect), each item in the list was treated similarly to every other item: a list was initiated independently of the subject's behavior, but each separate item in it required a response from the monkey, either pressing a panel or displacing an object.

The suggestion, then, of these results taken together is that attention to an item at the time it is presented promotes memory for that item and is facilitated either when the item is the signal for a response from the monkey or when the item is produced by a response from the monkey. This is a reassuring conclusion, since it is no more than a statement of the grounds on which experimenters commonly suppose it beneficial to arrange, in memory experiments, for acquisition events to be related to the monkey's behavior in one or both of these two ways.

This analysis suggests an additional comparison, that of overall performance level. Tasks that relate every item to the monkey's behavior should, it appears, produce higher performance levels than those that relate only the beginning of a list to it. This is the case. Sands and Wright observed their monkey's performance dropping well below 90% correct for most items in a 10- or 20-item list. Gaffan (1977b), who required a response to each item in a comparable task, also with pictures and also with rhesus monkeys, observed in normal monkeys virtually errorless performance even at the longest retention intervals tested, when 18 pictures intervened between the acquisition presentation and the retention test of a particular picture. There are some other differences of procedure between the two experiments, but nevertheless this comparison, which Sands and Wright overlook in both of their reports, is consistent with the presumption that memory is improved by relating item presentation to a monkey's behavior.

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There is every reason to suppose, of course, that factors other than the minor procedural variation identified above are at work in the production of primacy effects when human subjects recall words. The generalization which Roberts and Kraemer wish to draw from their results may thus be theoretically as well as empirically weak.

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