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SUCCESSFUL AND UNSUCCESSFUL STRATEGIES OF SEARCH IN AUDITORY MEMORY

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Summary.—In a multiple-target single-probe experiment on auditory memory, evidence was obtained for two different strategies of search, one being more efficient than the other both in terms of accuracy and rapidity. The result urges us to be cautious in the interpretation of experiments in which a large number of subjects low in accuracy are discarded in the screening phase.

It is common procedure in reaction time situations to discard subjects who do not reach a pre-determined level of accuracy during the screening or training phase. Although this procedure may be warranted by the need to avoid a large range of accuracy or the intention to study the effects of a particular treatment on speed and not on the decision, one must bear in mind that differences in accuracy may result from the use of different strategies. Selecting only highly accurate subjects may lead to investigation of one particular strategy instead of a general mechanism. The purpose of the present note is to illustrate the point by reporting on a dissociation between subgroups who are high and low in accuracy who show clearly different strategies of search in auditory memory.

The experiment was part of a program on effects of auditory laterality. The data relative to the experimental sessions are to be reported elsewhere. In this paper we shall describe results obtained in a training session before the selection of subjects.

A multiple-target single-probe paradigm (1, 2) was used. The target set varied from trial to trial and consisted of two CV (consonant-vowel) syllables among /ba, da, ga/. The targets were presented binaurally and the probe monaurally. Each syllable lasted 200 msec. There were silent intervals of 50 msec. between the first and the second target, and between the latter and the probe. The task was to decide as quickly as possible whether or not the probe was identical to one of the targets. Responses were given by moving a two-way switch in either one way or the other. In the training session were four blocks of 40 trials each. Subjects were university students who ranged in age from 18 to 22 yr. To select 8 subjects who would make less than one-third errors in the training session, 16 individuals had to be tested.

Table 1 shows the mean reaction times and the mean percentage of errors for "yes" responses [distinguishing between the identity to the first (1) and the second (2) stimulus] and "no" responses, as a function of subgroup of subjects high in accuracy (less than 33% of errors) and low in accuracy.

Quite clearly, the first subgroup was not only more accurate but also more rapid than the latter ($t = 3.48$, $df = 14$, $p < 0.005$). Six out of the 8 subjects low in accuracy were slower than the slowest highly accurate subject; the other two were both the most rapid and the most accurate in the group low in accuracy.

TABLE 1

MEAN REACTION TIMES AND MEAN PERCENTAGE OF ERRORS AS A FUNCTION OF RESPONSE, IDENTITY POSITION, AND SUBJECTS' GROUP

Group	"Yes" responses				"No" responses	
	RT_1	% Errors	RT_2	% Errors	RT	% Errors
High accuracy	689	25	590	9	651	19
Low accuracy	873	37	993	40	1054	59

While all subjects high in accuracy had faster reaction times for "yes" responses (averaged over the two positions) than for "no" ones, only four subjects low in accuracy were in this case ($p = 0.05$, by Fisher test). More interestingly, all subjects high in accuracy had faster reaction times for judging the probe identical to the second target than for judging it identical to the first target, while the reverse outcome was observed for seven subjects low in accuracy ($p < 0.005$, by Fisher test). Highly accurate subjects would be those who compare the probe first with the trace of the more recent binaural stimulus (which might still be in some kind of precategorical memory) and then with the older one. Subjects low in accuracy would follow a rather different strategy: they seem to search for previous events in memory in order of occurrence.

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