Retroactive inhibition of preexperimentally established associations

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In a pretest, A-B associations of 40 male undergraduates were obtained to A words with primaries of high or low frequency in Palermo and Jenkins' norms. Ten trials with paragraphs containing A-C or D-C associations followed. In a posttest with A words alone, more C words and changes from pretest associations occurred after acquisition of A-C than of D-C associations. Experimentally established associations produced RI of preexperimentally established associations. Strength of primary made no difference.

Of concern here is experimental induction of retroactive inhibition (RI) of preexperimentally acquired relationships between words and their associates. These relationships were specified indirectly from Palermo & Jenkins (P-J; 1964) norms for male undergraduates. They were specified directly by a pretest in which the relationship between each word and its primary defines an A-B association. A-C associates were established experimentally by a task that can be described as paired associates presented as (connected) discourse. As a control, D-C associations were established by a parallel task. An A-B posttest followed.

Strength of A-B associations was manipulated by selection of words that, by P-J norms, could be expected to evoke primaries of relatively high or low frequency (f).

METHOD
Stimuli; A-C, D-C Tasks
The words with high-f primaries were boy, lamp, and dogs; those with low-f primaries were citizen, soldier, and people. The high-f primaries were girl, light, and cats, and the low-f primaries were man, man, and crowd, respectively.

In the experimental (A-C) task, A words with high-f primaries appeared in one paragraph, and words with low-f primaries appeared in another paragraph. Words of both classes were paired with C words that always followed them either immediately or with no, one, or two intervening words. The latter were typically prepositions, articles, and conjunctions. The particular C words selected met two criteria: (a) nonoccurrence in the P-J norms as responses to any A word; and (b) appropriateness as a word consistently accompanying an A word in sentences. The A-C pairs were boy−companions, lamp−stanchion, dogs−waited, people−fail, soldier−specialties, and citizen−college training.

Paragraphs with A words of high-f primaries and those with A words of low-f primaries occurred first equally often. Within each paragraph, order of occurrence of A-C pairs differed from trial to trial. However, the immediate context of each pair remained constant.

The control (D-C) task was identical to the A-C task except for substitution of appropriate D words for A words. The D-C pairs were tourist−companions, sign−stanchion, children−waited, parents−fail, worker−specialties, and girl−college training.

Procedure
The A-B pretest, the A-C or D-C task, and the A-B posttest occurred in immediate succession. Materials for these phases were assembled in a single booklet. For the pretest, A words occurred on successive pages in a different random order for each S. Five seconds were allowed for each S to write his first association to each word, other than the word itself. In this and subsequent phases, Ss turned each page on instruction.

Each of the 10 trials of the A-C or D-C task consisted of one page of paragraphs with complete pairs for study followed by another page with C words deleted. During each trial, 20 sec were allowed for study, and 20 sec for filling in the C words.

For the posttest, A words occurred on two successive trials under the conditions of randomization and instructions of the pretest.

Subjects
Forty male undergraduates taking introductory psychology at Rutgers College were assigned randomly in equal numbers to the A-C or D-C tasks. They were run in groups.

RESULTS
A-B Pretest
For each A word, Table 1 shows the primary response(s), its(their) f, and the number of different responses for the 20 Ss of the A-C and D-C conditions separately. For each condition, the primaries obtained for words with high P-J f agreed with the norms. The primaries (citizen excepted) obtained for the words with low P-J f were among the primaries or associations of the norms. The association patterns of Ss of the A-C and D-C conditions appear equivalent to each other and consistent with the norms.

A-C, D-C Tasks
Table 1 also shows mean correct responses across 10 trials with A-C or D-C pairs. By Trial 10, 12 Ss were responding perfectly on the A-C list and 14 on the D-C list. For both lists, most of the errors were omissions. Intrusions that occurred with the A-C list were compared both with group primaries and with Ss' own associations. Neither primaries nor Ss' own associations occurred among the 44 intrusions, 19 of which were intralist intrusions.

In the analysis of variance on correct responses across 10 trials, strength of primaries and specific A words nested by strength were additional variables. The A-C and D-C tasks were equivalent, $F(1,38) = 1.36$, $p > .05$. Across tasks, the C words assigned to A words with low-f primaries were not learned as rapidly as those with high-f primaries, $F(1,38) = 21.72$, $p < .01$. Because this difference held for both tasks, it is attributed to characteristics of the C words per se rather than to strength of A-B associations. Differences occurred among specific words, $F(4,152) = 12.65$, $p < .01$. The interaction of A-C, D-C conditions with specific words, $F(4,152) = 9.66$, $p < .01$, reflected no interpretable pattern of differences.

A-B Posttest
Retroactive effects of the A-C task are expressed both as occurrence of C responses and as all changes from B responses of the pretest. Table 1 also shows totals of C responses and of all changes averaged across the two trials of the A-B posttest. For the A-C condition, per trial totals of C responses for the six words ranged from 3.5 to 9.0. For the D-C condition, there were no C responses. For this difference, $F(1,38) = 19.63$, $p < .01$.

More C responses occurred to A words with high-f than with low-f primaries. The difference was not significant, $F(1,38) = 1.95$, $p > .05$. Differences among words were significant, $F(3,304) = 5.18$, $p < .01$. Because of the absence of C responses for the D-C condition, conditions and words interacted, $F(4,304) = 5.18$, $p < .01$.

For the A-C condition, per trial totals of changes from the pretest ranged from 8.5 to 15.5. For the D-C condition, they ranged from 3.5 to 10.0. The greater change in the A-C than in the D-C condition, $F(1,38) = 10.30$, $p < .01$, held over all six words.

Table 1
Primary Responses to A Words, Frequencies (f) of Primaries and Number of Different Responses (N) during the Pretest; Mean Number of Correct Responses during A-C, D-C Tasks; C Responses per Trial during the Posttest, and Response Changes per Trial from the Pretest

| Word | Condition | A-B Pretest | | | A-C, D-C | A-B Posttest | |
		Primary	f	N	Correct Responses	C Responses	Changes
Boy	A-C	Girl[a]	18	3	6.8	4.5	8.5
	D-C	Girl[a]	15	3	8.1	0.0	3.5
Lamp	A-C	Light[a]	5	8	8.0	7.0	13.0
		Shade[b]	5				
	D-C	Light[a]	9	6	8.7	0.0	4.5
Dogs	A-C	Cats[a]	18	3	8.2	9.0	9.5
	D-C	Cats[a]	18	3	7.7	0.0	6.5
Citizen	A-C	American[b]	3	14	6.3	6.0	13.0
	D-C	Country[b]	4	11	8.2	0.0	10.0
People	A-C	Place[b]	2	14	7.4	3.5	15.5
		Crowd[a]	2				
		Citizen	2				
	D-C	Many[b]	4	15	6.4	0.0	8.5
Soldier	A-C	Man[a]	3	10	6.4	5.0	11.5
		Gun[b]	3				
		War[b]	3				
	D-C	War[b]	6	12	7.0	0.0	6.0

[a] Agrees with P-J primary
[b] Among P-J associations

More changes occurred to A words with low-f than with high-f primaries, $F_{(1,38)} = 11.65$, $p < .01$. Because this difference held for both A-C and D-C conditions, it was also attributed to characteristics of C words per se rather than to strength of A-B association. Differences occurred among words, $F_{(4,304)} = 8.42$, $p < .01$.

DISCUSSION

More C responses and changes in B responses occurred immediately after acquisition of the A-C task than of the D-C task. In the A-B pretest, associations of Ss in the A-C and D-C conditions were comparable, and both sets were consistent with P-J norms. The A-C and D-C tasks were equivalent. Consequently, posttest differences in C responses and in changes from B responses of the pretest can be attributed to acquisition of A-C or D-C association rather than to initial differences between conditions in A-B associations or to differential acquisition of A-C or D-C tasks.

Experimentally established A-C habits retroactively inhibit preexperimentally established A-B habits. However, strength of primaries to A words, as specified indirectly from P-J norms and directly in the A-B pretest, did not influence acquisition of A-C pairs. Nor did this variable engender differences in RI. Conceivably, the greater strength of high-f than of low-f primaries is approximately offset by the larger number of competing responses in hierarchies of words with low-f primaries.

In investigations of transfer, retroaction, and proaction, A-C and D-C relationships are usually realized explicitly in paired-associates or embedded implicitly in lists presented in serial anticipation or other formats. The experimental task of the present experiment is a departure from these situations in that the A-C and D-C relationships, although treated analytically as paired associates, were embedded in sentences. Presumably this arrangement is more like extralaboratory situations.

REFERENCE

PALERMO, D. S., & JENKINS, J. J. Word association norms. Minneapolis: University of Minnesota Press, 1964.

NOTE