response uncertainty. A multiple linear regression analysis across problems indicated that subjective response uncertainty was significantly related to the confidence measure ($F = 40.02$, $df = 33$, $p < .01$), but that the difference scores were not making a significant contribution. The analysis is summarized in Table 4.

The major conclusion from the data is that the confidence-in-decision measure is an insensitive index of variations in accuracy of information processing within the present case. It is possible, of course, that Ss are sensitive to variations in accuracy, but there is no evidence of this within the experimental context employed in the present study. Both response uncertainty and amount of information are significant contributors to confidence, and they could be "washing out" any effects of perceived departures from optimal information processing. A second conclusion from the data is that the S is able to track variations in subjective response uncertainty, even in those cases where the variable represents a departure from objective response uncertainty. This conclusion is based on the multiple linear-regression analysis which employed data from all three time conditions.

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NOTES

1. This research was supported by Grant 9401-43 from the Defence Research Board (Canada).

2. Both objective and subjective response uncertainty values are calculated in terms of the formula for average uncertainty: $H = \Sigma p_i \log_2 p_i$, where p_i is the probability of the i^{th} response alternative.

Effects of meaningfulness and learning instructions on the isolation effect[1]

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Two assumptions pertinent to isolation-effect studies were examined. Contrary to an assumption that the isolation effect is due to differential rehearsal of conspicuous items, instructions designed to distribute practice time across list items did not reduce the isolation effect. Prediction of equivalent total list recall for isolation and nonisolation conditions followed from an assumption that isolating a list item alters the distribution but not total amount of list rehearsal. Contrary to the latter assumption, total list recall was lower in isolation than in nonisolation conditions, except under instructions to distribute rehearsal time and with low-meaningful units.

The isolation effect refers to the finding that recall of an item when it is set apart is superior to recall of the same item when it is not set apart. A typical demonstration of the effect involves an isolation condition, in which an item midway in a list is printed in red when remaining items are printed in black, and a nonisolation condition, in which the same item appears in the same list but with all items printed in black. One account of isolation-effect findings (Waugh, 1969) is that a greater portion of practice time allotted for the list is spent on the item in isolation than in nonisolation conditions. However, total list recall supposedly will not differ for isolation and nonisolation conditions, since the facilitation of total list recall by differential rehearsal of the isolate is offset by the negative effect on recall of reduced rehearsal of remaining list units. A sizable portion of isolation findings agree with Waugh's analysis (cf. Wallace, 1965). One implication of her account is that the isolation effect will be absent when memorization instructions prevent differential rehearsal of the isolate. The deduction was tested by comparing the isolation effect under conventional (C) memorization instructions that permitted differential rehearsal of the isolate and distributed-practice (D) instructions that required equivalent practice on each list unit. In light of the Rosen, Richardson, & Saltz (1962) finding of a greater isolation effect with low-meaningful (LM) than with high-meaningful (HM) units, meaningfulness was also varied. If Waugh were correct, no differences in total list recall between isolation and nonisolation conditions would occur for either LM or HM units, although isolation-effect magnitude could vary with meaningfulness.

METHOD

Seventy-two undergraduates participated, nine in each of eight conditions formed by combination of meaningfulness (HM or LM), isolation-nonisolation (I or NI), and memorization instructions (C or D). Ss were tested in groups in separate replications, random assignment obtaining for each replication. Five 13-item lists for each level of M were formed by randomly sampling without replacement from a pool of AA Thorndike-Lorge (1944) nouns (HM) and from a pool of 60%-80% association-value CVC trigrams from Archer's (1960) norms (LM). In I conditions, the seventh item in each list was set apart by printing it in red. For both C and D instructions, the face page of S's recall booklet indicated that a number of lists would be presented and that after each presentation unordered recall would be requested. The D instructions, modified from Allen (1968), also told S that he was to repeat each list item until the next item

appeared. Simultaneous running of C and D conditions was accomplished by printing learning instructions on the face page of S's booklet. Upon presentation of each list, S was given 30 sec for recall on the appropriate page of the booklet. Lists were presented by a Carousel-type projector with attached timer at a 2-sec rate. When S had been presented each of the five lists once, presentation and recall of each list was repeated.

RESULTS AND DISCUSSION

Recall of the Seventh

In isolation-effect analyses, the frequency with which an item in Position 7 was recalled across lists and repetitions of lists was the basic datum. Means for the various treatment combinations are given in Table 1. Averaged across meaningfulness-instruction conditions, recall of the seventh item was 4.66 when isolated and 3.66 when not isolated. The difference was significant [$F(1,64) = 4.32$, $p < .05$], confirming the reliability of the isolation-effect phenomenon. Meaningfulness was the only other significant source [$F(1,64) = 5.34$, $p < .05$], Fs (1,64) being close to unity for remaining effects. Since the Learning Instruction by Isolation interaction was not significant, we may conclude that differences in recall of the seventh between I and NI conditions were comparable for C and D instructions. Hence, the notion that the isolation effect is due to differential rehearsal of the isolate was not supported. An alternate interpretation is that D instructions were ineffective in distributing rehearsal time, a conclusion at odds with Allen's (1968) finding that instructions similar to the present D instructions were effective in distributing practice time across list items. The more pronounced isolation effect with LM than with HM units reported by Rosen et al in a serial-learning task did not occur in the present free-recall task. Although not statistically significant, magnitude of the isolation effect was greater with HM than with LM units in the present study.

Total List Recall

The assumption that isolation alters the distribution but not the total amount of practice time was examined by comparing total list recall (summed across lists and repetitions of lists) for I and NI conditions. Averaged across meaningfulness-instruction conditions, total list recall was 59.94 items in the I condition and 61.47 items in the NI condition, the difference failing to reach significance [$F(1,64) < 1$]. As in the analysis of recall of the seventh, meaningfulness was a significant source of variation [$F(1,64) = 85.21$, $p < .001$]. The effect of instructions was not significant [$F(1,64) < 1$]. Lack of an overall effect of isolation appeared to support the hypothesis of equivalent total list recall for I and NI conditions. However, of remaining sources, the interaction of meaningfulness, isolation, and instructions reached significance [$F(1,64) = 7.73$, $p < .01$]. Examination of mean total list recall (Table 1) shows the form of the interaction and indicates that compensatory effects were responsible for lack of an overall effect of isolation. With HM lists, total list recall was lower in I than in NI conditions for both instructions, superiority of the NI condition being somewhat more pronounced with D instructions. With LM lists, recall was higher in NI than in I conditions only with C instructions, a marked superiority of the I condition occurring with D instructions. Superiority of the I condition with LM lists and D instructions appears to balance the superior recall of NI conditions in remaining meaningfulness-instruction conditions. Hence, total list recall was generally lower in I than in NI conditions, a result questioning the validity of Waugh's assumption.

Table 1
Mean Recall for the Seventh Item, Two Items Preceding the Seventh, and Entire List

Meaningfulness	Instructions	Isolation	Recall Category		
			Seventh	Two Preceding	Entire List
H	C	I	5.55	8.00	71.33
		NI	4.11	8.63	72.22
	D	I	5.22	6.11	67.88
		NI	4.00	11.67	72.66
L	C	I	3.33	5.22	46.44
		NI	3.22	6.67	53.00
	D	I	4.55	6.67	54.11
		NI	3.33	5.78	42.11

Recall of Items Preceding the Isolate

Since isolation facilitated recall of the seventh item while generally lowering total list recall, recall of items excluding the seventh must generally have been lower in I than in NI conditions. Examination of serial-position data suggested that the locus of the effect of isolation on remaining list units was in the two positions preceding the isolate. Inspection of Table 1 shows a close correspondence of the pattern of results for total list recall and the pattern of results for recall of the two items preceding the seventh. Where isolation facilitated total list recall (LM lists, D instructions), recall of the two preceding items was facilitated. In remaining conditions, recall of the two preceding and total list recall were lower in I than in NI conditions. Statistical analyses confirmed the above. As in the analysis of total list recall, meaningfulness, isolation, and instructions significantly interacted [$F(1,64) = 7.68$, $p < .01$].

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NOTE

1. The present project was part of the senior author's MA thesis.