Narrative stories as mediators for serial learning[1]

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Subjects learned 12 serial lists of 10 nouns by one of two methods: a control method of normal study and rehearsal, or a narrative-chaining method, where S was instructed to construct a meaningful story woven around the words to be remembered. Each Narrative S was permitted as much time as he needed for constructing each story, typically taking 1-2 min. His yoked control mate was given the same amount of time to study each list. Recall of each list immediately after it was studied was perfect for all Ss. However, after the 12 lists had been studied, a probe test for longer-term recall of each list showed Narrative Ss recalling six-seven times as much as their yoked Controls. Average median recall was 93% vs 13% for the Narrative and Control Ss, respectively. The results appear to demonstrate the role of thematic organization in increasing learning, decreasing interlist interference, and guiding reconstructive recall.

A technique recommended by mnemonists (e.g., Young & Gibson, 1962) for learning serial lists is the "chaining" method, whereby S is enjoined to construct a narrative story around the critical words to be remembered. The critical words are to be woven into the story in the order they are to be recalled, and these words should be emphasized in some manner, e.g., by vocal stress, pausing, or by making them the main actors or objects in the narrative. The prescriptions permit a wide latitude in constructive details (e.g., the number of critical words per sentence) depending upon the ease of organizing the particular list of words to be learned. A common additional prescription is that S should try to visualize the scenes he is constructing for linking the successive words.

Such procedures request that S generate very many contextual verbal responses. And it is not at all obvious why these should aid memory rather than compete or interfere with recall of the critical words. Further, a prior study by Jensen & Rohwer (1963) found no effect of sentence mediators (linking words n and n + 1) upon rote learning by the serial anticipation method. However, the Jensen and Rohwer study had several features not conducive to showing verbal mediation effects: (a) successive linking sentences were unrelated and were provided by E only on the first trial, and (b) the Ss were mental retardates learning a picture series.

For several reasons, then, our initial study with the chaining technique was done simply to see whether it "worked" efficiently in circumstances for which it plausibly might be efficient. These circumstances were (a) self-paced exposure to the complete serial list, (b) the critical recall units were content words (nouns), and (c) S had a large number of lists to learn and remember, so that massive interference and forgetting would normally be expected for control Ss not using the narrative chaining technique.

METHOD

Each S studied and recalled 12 successive serial lists consisting of 10 concrete nouns chosen to be apparently unrelated. All Ss were run individually; they first received general instructions for the serial learning task. The Narrative Ss were then briefly instructed on the mnemonic technique, as follows: "A good way to learn a list of items is to make up a story relating the items to one another. Specifically, start with the first item and put it in a setting which will allow other items to be added to it. Then, add the other items to the story in the same order as the items appear. Make each story

meaningful to yourself. Then, when you are asked to recall the items, you can simply go through your story and pull out the proper items in their correct order."

The Narrative S was handed the first list of 10 words and told to make up his story. He did not have to say his story aloud, and he could take as long as he needed. When S was finished, he handed the list back to E (who recorded the time taken by S), and then S immediately recalled the serial list just studied. Then the second through twelfth lists were gone through in the same way. For each Narrative S, a yoked Control S was run who received the 12 lists in the same order, each for a study-time equal to that taken by the Narrative S. The Control S was told simply to study and learn each serial list, and he also did an immediate recall of each list just after he had studied it. After the twelfth list had been studied and immediately recalled, S was asked to recall the first list again, then the second list, and all subsequent lists. The cue for recall of a list was the first word in that list; S was asked to recall the remaining nine words of that list in their correct order.

The Ss were 24 undergraduates fulfilling a service requirement for their introductory psychology course. Alternate Ss were assigned to be in the Narrative vs yoked Control condition. Each pair of Ss received the 12 lists in a different order within the day.

RESULTS

The times taken by the Narrative Ss to construct their story varied from 40 sec to 199 sec with a grand mean of 104 sec. Fifty-seven per cent had times between 1 and 2 min. These times grew shorter over the first four lists, as though Ss were becoming more proficient at concocting their stories.

Neither group experienced any difficulty in the immediate recall test that followed study of a list. Median percentages recalled were 99.9% and 99.1% for the Narrative and Control Ss, respectively. However, the differential learning and/or forgetting for the Narrative Ss showed up strongly in their later recall, when S tried to recall all 12 lists. The median percentages of words recalled in their correct list and correct absolute position are shown in Fig. 1 for the two groups for the 12 lists. There is a tremendous difference, with the Narrative Ss recalling six to seven times more than their yoked Controls. There was no overlap in recall scores of the two
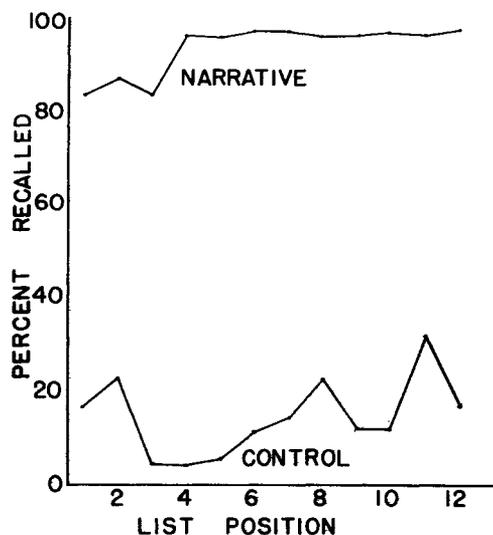

Fig. 1. Median percentages recalled over the 12 lists.

Table 1
Sample Stories

A LUMBERJACK DARTed out of a forest, SKATEd around a HEDGE past a COLONY of DUCKs. He tripped on some FURNITURE, tearing his STOCKING while hastening toward the PILLOW where his MISTRESS lay.

A VEGETABLE can be a useful INSTRUMENT for a COLLEGE student. A carrot can be a NAIL for your FENCE or BASIN. But a MERCHANT of the QUEEN would SCALE that fence and feed the carrot to a GOAT.

One night at DINNER I had the NERVE to bring my TEACHER. There had been a FLOOD that day, and the rain BARREL was sure to RATTLE. There was, however, a VESSEL in the HARBOR carrying this ARTIST to my CASTLE.

groups on any list; the average of the median scores was 93% for the Narrative Ss vs 13% for their yoked Controls.

The picture is much the same if one scores recall leniently, counting a word correct regardless of the order or intended list in which it was recalled. For Control Ss the list words have simply become unavailable, whereas this has been prevented in some way by the narrative-story constructions.

There are small effects due to list order apparent in Fig. 1, an improvement over early lists for Narrative Ss, and a slight serial-position curve for Control Ss. These are ancillary findings of no interest here.

We next examined the relationship between study-time on a list and later recall of that list. First, for each S, recall of the six lists with his longer study times was compared to recall of the six lists with his shorter study times. In this within-S comparison, there was no suggestion of a short vs long difference in recall for either the Narrative or Control Ss. This may have been because variation of an S's study times was relatively small. Second, over the 12 Ss by 12 lists in each condition, the 144 cases were divided at the median study time, and average recall scores computed for the shorter vs longer times. For the Narrative Ss, average recall for the lists with the shorter study times was 88% vs 92% for the lists with the longer study times. For the Control Ss, average recall was 12% for the shorter-time and 41% for the longer-time lists; these differ significantly, indicating that Control Ss yoked with fast Narrative Ss recalled less than those yoked with slow Narrative Ss.

These comparisons reveal that recall of Control Ss was affected by study time, while that of Narrative Ss was not. However, this effect of study time on Control Ss is still far from accounting for the main effect of the narrative elaboration. (Incidentally, Control Ss always felt that they had more than enough time to learn each list—until the final recall tests.)

Stories were taken from a few Narrative Ss after their final recall; a sample of these are shown in Table 1 with the 10 critical words capitalized. These have a certain "stream of consciousness" sense and unity about them, and they are not bad solutions to the task of connecting 10 unrelated nouns in a specified order.

DISCUSSION

We think the effect in this experiment is *probably* due to thematic organization. The person generates meaningful sentences to relate successive words, and he tries to relate successive sentences of his generated text around some central theme or action imagery. The sentences and themes from successive lists are different and probably are kept distinct from one another in memory. The first-word cue prompts recall of the theme, and from that the person appears to *reconstruct* the sentences and pull out the critical words. The reconstruction appears to be hierarchical, from theme to sentences to critical words. We would presume that this thematic organization affects learning and that it also reduces interference between the many lists S is learning. Further studies of this effect could yield more useful information by recording Ss' total verbal behavior ("thinking aloud") at study and at recall.

A remarkable aspect of the performance of Narrative Ss is that they rarely intruded nonlist words in their recall (less than .5 per S). One might first suppose that this discrimination between critical vs context words was based on form class, since all critical words were concrete nouns. But a glance at the sample stories in Table 1 shows (a) some context words are nouns, and (b) some critical words are used as verbs or adjectives in the stories. The basis for this high level discrimination between critical and context words added by S remains somewhat of a mystery.

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