

identical last names by including the initials of their first and, if necessary, middle names. If your class is not too large, you can tally the results by a show of hands. (Students are unlikely to be embarrassed to report their own recall, or lack thereof, but you can col-

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|----------------|----------------|---------------------|----------------|
| 1. Washington | 12. Taylor | 23. Harrison | 34. Eisenhower |
| 2. J. Adams | 13. Fillmore | 24. Cleveland | 35. Kennedy |
| 3. Jefferson | 14. Pierce | 25. McKinley | 36. L. Johnson |
| 4. Madison | 15. Buchanan | 26. T. Roosevelt | 37. Nixon |
| 5. Monroe | 16. Lincoln | 27. Taft | 38. Ford |
| 6. J. Q. Adams | 17. A. Johnson | 28. Wilson | 39. Carter |
| 7. Jackson | 18. Grant | 29. Harding | 40. Reagan |
| 8. Van Buren | 19. Hayes | 30. Coolidge | 41. Bush |
| 9. Harrison | 20. Garfield | 31. Hoover | 42. Clinton |
| 10. Tyler | 21. Arthur | 32. F. D. Roosevelt | 43. Bush |
| 11. Polk | 22. Cleveland | 33. Truman | |

lect their responses, redistribute, and have each student report another's results.) Number from 1 to 43 on the chalkboard and read off the presidents' names in order. To refresh your own memory, they are:

Next to each number write down the number of students who recalled that president. The serial position effect will be obvious—the first and the last presidents are recalled best. If you like (and have a large enough chalkboard), you can plot the curve with 1 through 43 along the horizontal axis and the probability of recall (divide number of students who recalled the name by total class size) along the vertical axis.

With this exercise you will also demonstrate the von Restorff effect. Near the middle of your curve you will have a spike. Lincoln will be recalled about as well as Washington and Bush. Teddy Roosevelt is also likely to show a spike, although smaller. Researchers have found that a unique item embedded in an otherwise homogeneous list is recalled better than the average homogeneous items. Often, the items immediately around the distinctive one are also remembered better. Look to see if that is true for Buchanan and A. Johnson. Although different explanations have been offered for the serial position effect, Roediger and Crowder suggest that their results are most congruent with the hypothesis that end points of a series serve as distinct positional cues around which memory search is begun.

If you do not wish to take the time for this demonstration in class, assign it as a student project. Have students find volunteers to complete the task, pool the data, and report the results in class.

Roediger, H. L., & Crowder, R. G. (1976). A serial position effect in recall of United States Presidents. *Bulletin of the Psychonomic Society*, 8, 275–278.

B. What We Encode (pp. 356–361)

Classroom Exercise: Visually Versus Auditorily Encoded Information

Janet Simmons and Don Irwin have developed a classroom exercise that powerfully demonstrates the benefits of visual imagery.

The top half of Handout 9–3 contains instructions for the control group; the bottom half has the imagery group's instructions. Make half as many copies of 9–3 as you have students and cut the handouts in half. Distribute the top halves to one side of the class and the bottom halves to the other. It is important that people in each group only be aware of their own instructions. (This is subtly accomplished by handing sheets off the top of the stack to one side and sheets off the bottom to the other side.)

After students have read their instructions, read aloud the following sentences, pausing long enough between each for students to record their ratings.

1. The noisy fan blew the papers off the table.
2. The green frog jumped into the swimming pool.
3. The silly snake slithered down a steep sliding board.
4. The crafty surgeon won the daily double.
5. The skiing trumpeter started a gigantic avalanche.
6. The plump chef liked to jump rope.
7. The captured crook liked to do difficult crossword puzzles.
8. The small child sat under the lilac bush.

9. The medieval minstrel strolled along the babbling brook.
10. The distressed teacher ate a wormy apple.
11. The chocolate choo-choo train chugged down the licorice tracks.
12. The marching soldier lit a cigarette.
13. The long-haired woman had a phobia about scissors.
14. The cheerful choirboy sang off-key.
15. The toothless bathing beauty hardly ever smiled.
16. The sweaty gardener was wearing a scarf and mittens.
17. The spotted dog was sleeping in the sun.
18. The lanky leprechaun wore lavender leotards.
19. The bearded plumber was flushed with success.
20. The novice camper got lost in the woods.

Next have students turn the form over, number 1 to 20, and attempt to answer the following 20 questions, which you read to them. (Answers follow the questions, but don't give the answers until all 20 have been read.)

1. Who won the daily double? (the crafty surgeon)
2. What chugged down the licorice tracks? (the chocolate choo-choo train)
3. Who liked to do difficult crossword puzzles? (the captured crook)
4. Who sang off-key? (the cheerful choirboy)
5. What blew the papers off the table? (the noisy fan)
6. Who hardly ever smiled? (the toothless bathing beauty)
7. Who slithered down a steep sliding board? (the silly snake)
8. What was sleeping in the sun? (the spotted dog)
9. Who strolled along the babbling brook? (the medieval minstrel)
10. Who was flushed with success? (the bearded plumber)
11. What jumped into the swimming pool? (the green frog)
12. Who lit a cigarette? (the marching soldier)
13. Who got lost in the woods? (the novice camper)
14. Who started a gigantic avalanche? (the skiing trumpeter)
15. Who wore lavender leotards? (the lanky leprechaun)
16. Who liked to jump rope? (the plump chef)
17. Who had a phobia about scissors? (the long-haired woman)
18. Who sat under a lilac bush? (the small child)
19. Who ate a wormy apple? (the distressed teacher)
20. Who wore a scarf and mittens? (the sweaty gardener)

Then, have students score themselves as you read the correct answers (anything close counts as correct).

Reveal the different instructional sets. Finally, after reassuring the students that memory does not equal intelligence, write the scores for each group separately on the chalkboard as students call them out. The differences between the groups' scores will be highly significant with virtually no overlap. The control group typically gets from 2 to 14 correct and the imagery group from 12 to 20 right. The entire demonstration takes only 10 to 15 minutes.

Classroom Exercise: The Self-Reference Effect

The text describes the Craik and Tulving study in which semantic encoding produced much better memory than visual or acoustical encoding. Another factor, according to the text, that enhances memory is the self-reference effect. Rogers, Kuiper, and Kirker asked four groups of participants to process lists of words; three were to use visual, acoustic, or semantic encoding and the fourth group was asked to decide whether a particular word applied to themselves, that is, to process words in terms of "self-reference." Results indicated that processing information in terms of self-reference, whether or not the participants actually *felt* that the words applied to them, produced the best recall. It seems that just thinking of a word in terms of ourselves makes it more memorable. The self-reference effect has been replicated in numerous studies, involving children as young as 10 as well as elderly adults.

Other studies have also found that in processing words in terms of self-reference, we are even more likely to recall the words that do apply to ourselves than the words that do not. Donelson Forsyth and Katherine Hsu suggest a classroom exercise to demonstrate this effect. Begin by having students number from 1 to 18 on a blank sheet of paper. Tell them that you will read a list of adjectives; they should *circle the number* corresponding to the adjective if they feel it is self-descriptive (they are not to write down any adjective). Next, read through the list of adjectives in Handout 9-4. Then, after talking about other matters for a minute or so, ask students to list, in any order, any of the adjectives they can remember. Distribute Handout 9-4. Scoring is self-explanatory.

Several reasons have been offered for the self-reference effect. Perhaps the most popular interpretation is that self-referencing produces a more elaborate memory trace than semantic encoding, the self being one of the most highly elaborated structures in memory. Stanley Klein and John Kihlstrom suggest that organization, not elaboration, explains the self-reference effect. That is, self-referencing instructions lead people to organize the words on the list. Less organization is imposed when people are simply asked whether a word fits the meaning of a sentence. Klein and Kihlstrom found that self-referent and semantic encodings produce



HANDOUT 9-3

Please rate the sentences I will read aloud on how easily you can pronounce them. Repeat the sentences silently to yourself. Use the following scale.

	1	2	3	4	5
	very difficult to pronounce			very easy to pronounce	
1.		6.		11.	16.
2.		7.		12.	17.
3.		8.		13.	18.
4.		9.		14.	19.
5.		10.		15.	20.

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HANDOUT 9-3

Please rate the sentences I will read aloud on how well you can form a vivid mental picture or image of the action of the sentence. Use the following scale.

	1	2	3	4	5
	impossible to image			very easy to image	
1.		6.		11.	16.
2.		7.		12.	17.
3.		8.		13.	18.
4.		9.		14.	19.
5.		10.		15.	20.

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