

The Paired Associates Strategy

Enhancing Storage and Recall of Information

Janis Bulgren, Ph.D.
KU-CRL

"Research has indicated that most tests require students to master three types of information: pairs, lists, and definitions."

A new strategy, The Paired Associates Strategy, has been added to the Learning Strategies Curriculum. The Paired Associates Strategy involves the analysis and manipulation of information into meaningful pairs or groupings, the creation of study cards, and the application of easy strategies to enhance the storage and recall of the information.

The term "paired associates" is used when information is organized in pairs or small groups to work together in order to mean something important. To illustrate, the information that "President Nixon was the only president to resign" is an example of a pair, or two pieces of information ("Nixon," and "only president to resign") that work together to mean something important. The information that "In 1974, President Nixon was the only president to resign" is an example of a trio, or small group of information ("1974," "Nixon," and "only president to resign") that may need to be recalled together.

The Storage Strand

The Paired Associates Strategy is part of the Storage Strand of the Learning Strategies Curriculum along with three other strategies designed to help students master information. Research has indicated that most tests require students to master three types of information: pairs, lists, and definitions. Briefly, The Paired Associates Strategy involves the analysis and manipulation of information into meaningful pairs or groupings and learning that information. The FIRST-Letter Mnemonic Strategy is aimed at identifying and organizing important information into lists and mastering that information. The

Vocabulary Learning Strategy (LINCS) involves the use of key words and mental imagery to learn the meaning of new vocabulary words. When the three strategies are used in combination, students can organize, study, and master just about any type of information they encounter.

Research

The instruction associated with the Paired Associates Strategy was field tested in a midwestern urban school district (Bulgren, Hock Schumaker, & Deshler, 1995) in an experimental study using materials prepared by researchers. Every effort was made to ensure that the materials used in the study represented demands similar to those found in content classrooms. Results of the field test indicate that when students were given information in lists similar to what might be found on a study guide, asked to study the information, and took a test over the information, they earned an average score of eighteen percent on pretests and an average score of eighty-five percent on posttests. When they were given information in text form (similar to what students might encounter in textbook chapters or other similar printed material), they earned average scores of twenty-two percent on pretests and seventy-six percent on posttests.

Overview

The Paired Associates Strategy provides students with a functional and efficient way to markedly improve their performance with regard to mastering information. It involves two sets of steps. The first set of steps enables students to design mnemonic devices (memory devices) to help them master pairs or small groups of information. The second set of steps enables

(continued on page 2)

(continued from page 1)
 students to create study cards and master the information.

The first set of steps for creating a mnemonic device is cued by the mnemonic device "CRAM." The steps provide four different techniques to create ways to recall information and are as follows:

Step 1: Create a picture. This step cues students to create a strong mental picture of two items combined into one picture so the two are strongly linked. See Figure 1 for an example of how a student might create a picture in his or her mind to recall the information that "Gold was discovered in the Black Hills."

Step 2: Relate something. This step cues students to create mental pictures of items related to the items to be remembered and to combine those pictures into one mental picture. See Figure 2 for an example of how a student might use this step to form a device for the information that "President Monroe fought in the War of Independence."

Step 3: Add boxes. This step cues students to draw a box around a picture word in each of the informational items, make mental pictures of those words, and combine the pictures into one strong mental picture. See Figure 3 (page 3) for an example of how a student might draw a box around picture words in two items and then create a picture in his or her mind to recall the information that "Bagamoya is in Tanzania."

Step 4: Make a code. This step cues students to match each number to be remembered, such as the numbers in a date, with a code letter and to make a sentence using the code letters. See Figure 4 for an example of how a student might match numbers in a date to code letters and make a sentence using the code letters to recall the information that "The Great Depression occurred in 1929."

(continued on page 3)
 STRATEGRAM 2

Fig. #1

Paired Associates Strategy
CREATE A PICTURE

Gold was discovered in the Black Hills
 Item #1 Item #2

Create a picture of Item #1 (Gold) in your mind.



Create a picture of Item #2 (Black Hills) in your mind.



Combine the pictures into one picture in your mind.



Fig. #2

Paired Associates Strategy
RELATE SOMETHING

President Monroe fought in the War of Independence
 Item #1 Item #2

Make a picture of something related to Item #1 (Monroe) in your mind.



Make a picture of something related to Item #2 (War of Independence) in your mind.



Combine the pictures into one picture in your mind.



Fig. #3
Paired Associates Strategy

ADD BOXES

Bagamoya is in Tanzania
Item #1 Item #2

Draw a box around a picture word in Item #1 (Bag amoya), and make a picture of that word in your mind.



Paper bag

Draw a box around a picture word in Item #2 (Tan zania), and make a picture of that word in your mind.



People getting a tan

Combine the pictures into one picture in your mind.



People getting a tan with paper bags on their heads

Fig. 4

Paired Associates Strategy

MAKE A CODE

The Great Depression occurred in 1929.

Item #1

Item #2

Match each number in a date to a letter code.

1	9	2	9
↓	↓	↓	↓
C	M	D	M

Make a sentence using the code letters.

Crashing Markets Depress Me

When making the sentence:

- * Keep the code letters in the same order.
- * Make sure the first four words in the sentence start with capitalized code letters.
- * Include the other item or the meaning of the other item in the sentence if you can.

(continued from page 2)

The second set of steps enables students to identify important pairs or groups of items from their textbooks, study guides, or lectures, create study cards with appropriate study questions for those items, master the pairs or small groups of related information, and test themselves over the information until it is mastered. The second set of steps is cued by the acronym "PAIRS" and includes the following:

- Step 1: **P**ick a clue. This step cues the learner to use a variety of clues to identify important information.
- Step 2: **A**rrange the items. This step cues the learner to write an identified pair or trio on a study card.
- Step 3: **I**dentify the questions. This step cues the learner to create questions about the identified information and write them on the study card.
- Step 4: **R**ecast the information using the steps of "CRAM." This step cues the learner to create a mnemonic device using the "CRAM" Steps.
- Step 5: **S**elf-test. This step cues the learner to master the information. See Figure 5 for example cards.

Thus, this strategy provides students an organized way of independently approaching large bodies of information that need to be mastered. More importantly, while using this strategy, students actively manipulate information to put it into a form that is easy to remember. This is one of the most significant benefits of this strategy because, while using it, students must actively interact with content information—a prerequisite for learning that information.

The *Paired Associates Strategy* is particularly useful for low-achieving students for several reasons. First, they often have difficulty passing tests in required courses, and a major part of their grades in these courses is often

(continued on page 4)

(continued from page 3)

dependent on their performance on tests that require them to recall and write about related facts as a means of demonstrating their knowledge of a body of information. Second, low achievers tend to be passive instead of active when faced with studying for a test; they do not know how to identify information to be learned or how to learn it. Third, they often exhibit apathetic or fearful attitudes toward the entire test-taking process. Instruction in this strategy produces relatively quick and significant performance gains in actual course tests for most students. Thus, instruction in the *Paired Associates Strategy* builds low-achieving students' confidence in their test-taking abilities quickly and relatively painlessly while enabling them to improve their grades in required courses.

Fig. #5

A Card for the

PAIRED ASSOCIATES STRATEGY

**President Thomas Jefferson made the
first Louisiana Purchase in 1803.**

Front of Card

**Who made the
LOUISIANA PURCHASE
and when was it made?**

Back of Card

**What large purchase did
JEFFERSON
make in
1803?**

Instruction

For the most part, the instruction can be implemented in different kinds of instructional settings. It was initially designed for small groups of students (approximately 3-6). Students seem to benefit from observing other students' responses while learning the strategy. Small-group instruction also allows the instructor ample opportunity to provide individual feedback to students on a regular basis.

This does not mean that the *Paired Associates Strategy* cannot be taught to individuals (in a one-to-one format) or to larger groups of students. Indeed, some teachers have taught some of the strategies successfully to as many as 30 students at one time. This has been accomplished by introducing the strategy to the whole group and then having some students practice the new strategy or previously taught strategies independently or in pairs, while the teacher has provided feedback and additional instruction to other students.

The *Paired Associates Strategy* is appropriate for any student who is receiving instruction in mainstream classes and

(continued on page 8)

SIM @ Wethersfield High School Wethersfield, Connecticut

A "Blue Ribbon" School

The *Strategies Intervention Model* played a role in the selection of Wethersfield High School, Wethersfield Connecticut as one of the "Blue Ribbon Schools" in the United States. Two hundred and sixty-six schools, 215 public and 50 private, were recognized by the U.S. Department of Education in an official White House ceremony in May. These successful schools demonstrated key ingredients for success:

- * Challenging academic standards and a rigorous curriculum for all students.
- * A disciplined, supportive, safe, and drug-free environment;
- * Participatory leadership and a strong partnership among family, school, and community;



- * Excellent teaching and an environment that strengthens teacher skills and improvement;
- * Low dropout rates and documented student achievement.

The schools were nominated by state education agencies, the Bureau of Indian Affairs, the Department of Defense, and the Council for American Private Education.

To be selected for recognition, a school conducts a self-evaluation that allows teachers, students, parents, and community representatives to assess their strengths and weaknesses and



develop strategic plans for the future. The school then submits a written application, including information on their progress toward achieving the National Education Goals. A review panel selects the most promising schools for site visits by experienced educators who submit reports on their findings. The review panel considers the reports and makes their recommendations.

The SIM Program at the high school was so highly regarded during the site visit that Rosemary Tralli, a SIM Trainer, was chosen to accompany principal, Dan Casey and assistant principal, Roseanne Hornyak, to receive the school's award.

(continued on page 7)

Strategy Sticker Reminder for the Generalization Stage of the *Paraphrasing and Sentence Writing Strategy*

Janette DeFelice
Special Education Teacher
Baltimore County Public Schools
Baltimore, Maryland

What is a "Strategy Sticker Reminder"?

A "Strategy Sticker Reminder" is a sticker that is placed on students belonging to remind students to use a particular strategy in general education classes. It is also used to reward students for using the strategy.

How do you make the "Strategy Sticker Reminder"?

1. Obtain page-sized labels from an office supply store.
2. Photocopy the sticker pattern for the target strategy on the labels. (See examples on p. 7)
3. Cut out the stickers.

How do you use the "Strategy Sticker Reminder"?

1. Give the stickers to students who have reached the Generalization Stage of instruction for a strategy.



2. Ask students to set goals for the number of times he/she will use the strategy in other classes. Also ask the student to select prizes/reinforcers for when each goal is met (i.e., a "no homework" ticket, computer time).



3. Have the students put the stickers on binders, folders, or any other places where he/she will see it daily.

4. When the student uses the strategy in another class, have him/her show proof of this to you (e.g., have the student show you a paper or explain how the strategy was used. If the student

(continued on page 7)

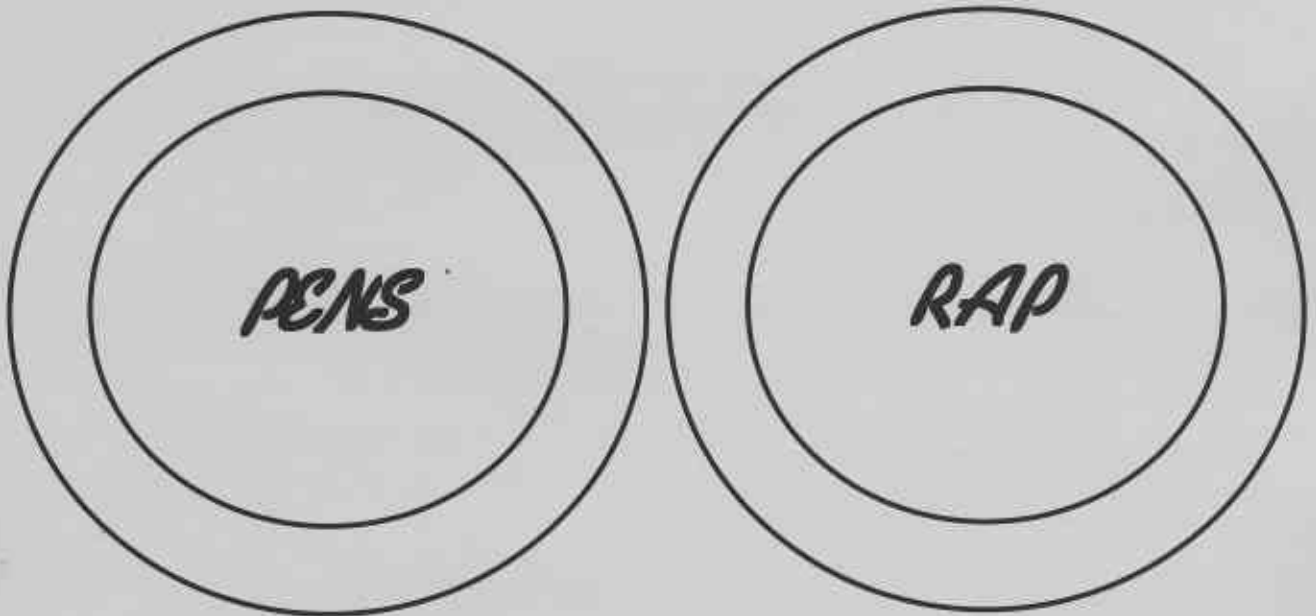
(continued from page 6)

can describe how he/she used the strategy, he/she earns one mini-sticker to be placed on the large sticker (i.e., a butterfly for the PENS sticker or a star for the RAP sticker).

5. When the student meets the original goal, the pre-determined prize/reinforcer is earned.

Benefits

Cool enough for middle school students and fun enough for elementary-aged students. Relatively inexpensive, easy and fast to make. Helps teachers encourage and reinforce generalization.



(continued from page 5)

Rosemary said, "The highlight of the trip was the opportunity to shake hands with President Clinton and Vice-President Gore after their welcoming speech on the South Lawn of the White House." The following day, the Secretary of Education, Richard Riley, presented a plaque and special flag to the recipients.

The U. S Department of Education is currently working with the states to explore ways to more widely share the successes of the participatory schools so that others can benefit from what works in their schools. Congratulations to Rosemary and Wethersfield High School!

(continued from page 5)

who is expected to master associated items of information in order to succeed on written tests. Teachers have reported that mastery of the *Self-Questioning Strategy* before learning this strategy helps students use the *Paired Associates Strategy* more effectively. By learning the *Self-Questioning Strategy* first, students learn to create questions about written information. Implementation of these two strategies in combination by students can result in successful independent learning.



Strategram Renewal Form 1996-97

(Send this form in with your check for \$13)

Name: _____

Address: _____

City, State & Zip: _____

Telephone: _____

(please place school district orders in the name of one employee)

Strategram

Vol. 8: Issue number 5. Published six times per year by The University of Kansas Center for Research on Learning, Dole Human Development Center-Room 3061, Lawrence, Kansas, 66045-2342. Subscription rate: \$13 per year. No part of this publication may be reproduced without written permission from the publisher, unless otherwise stated.

©1996 by The University of Kansas, Lawrence, Kansas, 66045. All rights reserved.

Editor
Mary Lee

Consulting Editors
Keith Lenz

Don Deshler *Jean Schunaker*

The University of Kansas
Center for Research on Learning
Rm. 3061 Robert Dole Bldg.
Lawrence, Kansas 66045-2342
1-913-864-4780

Address change requested

Non Profit Org.
U.S. Postage
PAID
Lawrence, Kansas
Permit No. 65