A STUDY OF THE USE OF
RETRIEVAL CUES

By

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Honors Thesis in Nursing
Ball State University
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April 17, 1972
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CHAPTER I
INTRODUCTION

A common problem to most patients, involves remembering to take prescribed medication correctly while at home.\(^1\) Taking the medication correctly refers to the dosage, time, and amount ordered by the physician.\(^2\) One of the reasons for these medication errors is forgetting to take the dosage because of other activities.\(^3\)

Problem

In relation to remembering to take medication, this question will be studied: Are retrieval cues, to recall taking prescribed oral medication, used by the forty to seventy year old residents of Muncie, Indiana, who are attending the Family Practice Clinic?

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The following definitions will be utilized throughout the study.

1. **Retrieval cue**: an aid "to the active search of the memory store".\(^4\)

2. **Recall**: "The form of remembering in which the subject demonstrates retention by repeating what was earlier learned."\(^5\)

3. **Prescribed oral medication**: Tablets, capsules, and/or liquid, which are therapeutic for a specific disease entity and/or its symptoms, ordered by a licensed physician, to be taken by mouth by a specified patient, in a specified amount and dosage, on a specified routine schedule.

Following is a list of possible retrieval cues to the recall of taking prescribed oral medication.

**A. Location**

1. at the bedside
2. on the kitchen table
3. on the kitchen cabinet
4. in the kitchen cabinet
5. in the pocket
6. in the purse
7. in the open where it is easily observable
8. in the room where one spends most of his time

**B. Physical Characteristics**

1. form

---


\(^5\)Ibid., p.596.
a. liquid  
b. capsule  
c. tablet  

2. shape  
a. O  
b. [ ]  
c. [ ]  
d. liquid  

3. color  

4. company marking  
a. number  
b. letter  
c. symbol  

C. Container  

1. color  
a. clear  
b. white  
c. colored  

2. characteristic markings  
a. colored lid  
b. colored label  
c. plastic lid  
d. imprint  

3. shape  
a. [ ]  
b. [ ]  
c. [ ]  
d. [ ]
4. material
   a. plastic
   b. glass
   c. paper

D. Specific System
   1. calendar with pills stapled on
   2. calendar with cues written on
   3. special cups to set the medication in
   4. special order of arrangement of medication
   5. colored rubberbands placed around the container
   6. special container for travel

Hypotheses

The investigator has hypothesized, that the patients interviewed from the Family Practice Clinic, will use one or more of the suggested retrieval cues to recall taking prescribed oral medication.

Sub-hypotheses to this study include the following:
1. Location of the medication will be used most often of the suggested retrieval cues.
2. A specific system to recall taking the prescribed oral medication will be used least often of the suggested retrieval cues.
3. More females than males will use one or more of the suggested retrieval cues to recall taking the prescribed oral medication.
4. The patients from the Family Practice Clinic will indicate a desire to have the physician suggest a retrieval cue or cues at the time the medication prescription is written.

Personal Interest

As a student in public health nursing, the investigator was confronted with patients and families exhibiting little knowledge as to the medications they were taking. All medications seemed to be of equal importance to the patient, whether it was a vitamin or insulin injection. Background reading supported the fact that it is not unusual to find the majority of home patients making medication errors.6

In one of the homes visited, a patient kept a calendar with the medication to be taken for each day written on. In another home, the patient placed colored rubberbands around certain bottles to remind her which to take that day. In still another case, a separate container was prepared ahead of time for each day's dose of tablets.

These former patients led the investigator to study medication errors made by patients.7 Out of this former study came the interest to study the present question:

6Curtis, op. cit., p.290.

7Marilyn Segert, "Errors in Taking Prescribed Medication at Home" (Term paper, Public Health Nursing, Ball State University, 1971).
Are retrieval cues, to recall taking prescribed oral medication, used by the forty to seventy year old residents of Muncie, Indiana, who are attending the Family Practice Clinic.

Related Literature and Research

Research and literature are greatly limited concerning retrieval cues to taking prescribed oral medication. Most of the information found deals directly with medication errors. This study does not deal with medication errors in general, but rather retrieval cues to recall taking prescribed oral medication specifically. Therefore only literature related to the use of such cues is included.

One study, done in 1968, found that more errors were made when no specific system to recall to take the medication was used. In 1970, McInnis documented the fact further by sampling urine of tuberculosis patients taking PAS and isoniazid. Those using some type of system to recall to take the medication, had more positive urine samples for the medication than those that said, "I just remember."

An example of a specific system is the pill calendar. This method of recall was tested in 1961 on tubercu-

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8Neely and Patrich, op. cit., p. 54.

nosis patients who were essentially asymptomatic. Each day's dose of pills were placed in a small plastic bag and stapled on a large calendar board. The board was placed somewhere in the home where it was easily observable. In this way, the family would be able to assist in reminding the patient. Forgotten pills were to be left on the board. The principle of the pill calendar was that the patient would gain "psychological gratification" for keeping an empty board. 10

The color of the medication seems to have some importance. Bartleson stated that each person has "memory colors" which are recalled in association with familiar objects, referring to those with which we have frequent visual contact. 11 Related to medication, color would be considered a retrieval cue to recall taking the prescribed oral medication to a patient who is familiar with his medication.

Also, in reference to color, Crider initiated a system of color coded labels for medication bottles in 1968. As an example, he used green labels for before meal medication and yellow labels for medication taken twice a day. When colored labels were unobtainable, colored ink was used. Crider claims that by using the color coded labels, to indicate the time the medication is to be taken, one does not


have to read the label each time.\textsuperscript{12}

It has been proven that one's recall for visual images is more rapid than for verbal material.\textsuperscript{13} Accordingly, one can understand why a patient could recall to take his medication by retrieval of the visual image, rather than retrieval of the doctors explanation. One's rapidity of recall of visual images is a sound reason for the use of retrieval cues in taking prescribed oral medication.

If the physical characteristics of the medication are to be considered as a retrieval cue, each oral medication must be different in shape, size, color, form, and have different markings. To prevent duplication a search of worldwide literature is done by a research pharmacist employed by each pharmaceutical laboratory. His work is to insure a unique product.\textsuperscript{14,15} The shape, size, and form also depend on product components, dosage necessary, and speed of absorption. Each tablet or capsule may have a company emblem or identification code stamped on.\textsuperscript{16} Simply stating the reason

\textsuperscript{12}Henry F. Crider, "Color-coded labels for dispensing", \textit{Hospital Topics} (April, 1969) : 86-87.

\textsuperscript{13}Ralph Norman Haber, "How We Remember What We See", \textit{Scientific American} 222 (May, 1970) : 104-112.

\textsuperscript{14}Thomas Blake, Medical Communications Associate of Roche Laboratories, personal letter, 24 February 1972.

\textsuperscript{15}Bayard Spaulding, Medical Services of The Upjohn Co., personal letter, 22 February 1972.

\textsuperscript{16}Blake, \textit{op. cit.}
for a certain medication design is that it "is dependent on providing the most effective dosage form while maintaining appeal to the senses".17

Abbott Laboratories is the one pharmaceutical company to manufacture a special container which could be considered as a specific system to recall taking medication. The Ogen (piperazine estrone sulfate) container is designed so that each tablet has a date near it. This method is to aid the patient to recall taking one tablet daily for the designated day of the month.18

Significance

Medication errors are made quite frequently, as previously indicated. To patients with tuberculosis, rheumatic fever, arthritis, and/or cardiac ailments, it is important that blood levels of the medication be kept at a stable level.19 In these cases an error of omission of a dose of the prescribed medication can be dangerous to the patient's health.

Professional people are aware of the existence of the problem, but as yet, of no way to solve the problem. This


18 Joseph J. Szypelman, Assistant to the Vice President of Abbott Laboratories, a personal letter, 20 March 1972.

19 Thomas Moulding, op. cit., p.284.
study, therefore, is indicated to begin the search for a method to eliminate errors of prescribed oral medication omission. Perhaps, by questioning these few patients as to the method they use to recall taking prescribed oral medication, a simple suggestion for others can be found.

In the future, physicians may be able to suggest a retrieval cue to the patient at the time a medication order is given.

Limitations

The study is limited to the city of Muncie, Indiana and further limited to the Family Practice Clinic of said city. This clinic was chosen due to the fact that all income groups are treated here. The clinic attempts to take one third of its population from each of the low, middle, and upper income groups. The clinic was, also, chosen because a record of each patient's medication is kept on file and easily obtainable for the investigator's purpose. The convenient location of this clinic to the investigator's residence was also a determining factor.

The age group interviewed ranges from forty to seventy years. This range is being studied to eliminate younger patients on birth control (a study in itself), and

20 Interview with Elizabeth Creamer, Family Practice Clinic, Muncie, Indiana, 22 February 1972.
children and older patients who are not solely responsible for taking their own medication.

The actual interviewing will be limited to 10:00 AM to 2:00 PM on Monday, Tuesday, and Thursday of the first two weeks of April, 1972. The interviewing time for each subject will be limited to five minutes.

Another limitation concerns the medication being tested. Only prescribed oral medication taken on a routine time schedule will be studied.

The question-interview technique is being used in the study. This method of study is limiting in itself due to the fact that it indicates acceptance of the validity of the patient's response.21

Further limiting to this study is the inexperience of the investigator in a study of this nature. Patients with language or literacy barriers will not be interviewed.

Method

The data gathering tool or interview guide was formed and tested on five subjects not of the clinic. In this way, it was proven useful and a time limit of five minutes for each interview was established. The interview guide to be used is the following.

INTERVIEW GUIDE

I. GENERAL INFORMATION
   A. NAME
   B. SEX
   C. AGE
   D. MEDICATION
      1. DOSAGE
      2. TIME SCHEDULE
      3. AMOUNT
      4. PURPOSE

II. LOCATION
   DO you keep the medication—
      a. at the bedside?
      b. on the kitchen table?
      c. on the kitchen counter?
      d. in the kitchen cabinet?
      e. in the bathroom medicine cabinet?
      f. in your pocket?
      g. in your purse?
      h. in the open where it is easily observable?
      i. in the room where you spend most of your day?

III. Physical Characteristics
   A. Is the medication a
      1. liquid?
      2. capsule?
      3. tablet?
   B. What is the color?
   C. Of which of the following shapes is the medication?
      1. 
      2. 
      3. 

4. liquid?
5. other?

D. Are any of the following markings on the medication?

1. a number?
2. a letter?
3. a symbol?

E. Do you feel that any of the following physical characteristics remind you to take the medication?

1. color?
2. shape?
3. form?
4. markings?

IV. Container

A. Is the medication container

1. colored?
2. clear?
3. white?

B. Is the material of the container

1. plastic?
2. glass?
3. paper?

C. Is the shape of the container one of the following?

1. 
2. 
3. 
4. 
5. other
D. Are any of the following characteristic markings on the container?
   1. a colored lid?
   2. a plastic lid?
   3. a colored label?
   4. an imprint?

E. Do you feel that any of the following characteristics of the container help you remember to take the medication?
   1. color?
   2. material?
   3. shape?
   4. characteristic markings?

V. Specific System
   A. Do you use a calendar with pills stapled on?
   B. Do you use a calendar with hints written on?
   C. Do you set the medication in special cups or containers?
   D. Do you arrange the medication in a specific order?
   E. Do you place colored rubberbands around the container?
   F. Do you place the medication in a special container for travel?
   G. Does your family remind you to take your medication?

VI. In the future, do you think doctors should give suggestions to their patients as to the best way to recall taking the medication he prescribes?
The investigator is the sole interviewer for the study. The patients to be interviewed will be selected according to the limits previously stated. Before each one arrives at the clinic, his chart will be reviewed to determine age, sex and medication.* The chart will then be flagged to indicate to the receptionist that this patient is an eligible subject.

When that patient arrives, the receptionist will say to the patient,

Mr./Mrs./Miss. (patient's name), would you please step into this room before seeing the doctor. The nurse inside would like to speak with you for a few moments.

The receptionist will say nothing more.

The patient will be escorted by the receptionist to a small room with a table and two soft chairs. The investigator will be sitting in one chair and will give this introduction:

Good morning Mr./Mrs./Miss. (patient's name). Are you enjoying the spring weather? Here is a chair you may sit in. Are you comfortable?

We, at the clinic, are trying to find ways to help people remember to take the medication prescribed for them by their doctors. We all forget to take medication at times, including myself. We hope that by asking a few people how they remember their own medication, we will find a suggestion for others. You are not being singled out from anyone else. I am asking several of the patients here to assist by answering a few questions? Would you care to participate?

This will take about five minutes. I am assuming that you have the medication, know how and when to take it, and how much to take. Answer only the questions I ask, as I ask it. After, I have finished the questions, you may

*Recorded in Section I. of the interview guide.
have a few moments to offer any suggestions you may have.

The interview will be conducted. Five minutes (as established from testing the interview guide) will be allowed for each interview to eliminate or control the factor of rambling suggestions by patient's, but still allow time for their suggestions. Suggestions will be accepted to allow the patient a sense of assistance and open the field for retrieval cues the investigator may have missed.

An assumption being made is that the patient has the medication and knows how to take it according to the physician's orders.

Analysis

The data obtained from the interviews will be analyzed and compared by the use of tables, bar graphs and percentages. The Physician's Desk Reference and the physician's orders, will be the references used to judge the patient's recall of physical characteristics of the prescribed oral medication.
CHAPTER II

DATA AND ANALYSIS

Data Collection

The data were collected by use of the interview guide in the method outlined. In the two weeks of this study only fourteen patients, fitting the requirement of age and of medication orders, were available at the clinic.

Eight males and seven females, ages 43 years to 70 years were interviewed. There was great variation between patients. Several were poorly dressed while others wore quite expensive looking attire. Some were clean while others were dirty. The patients sampled verified the fact that the clinic serves all income groups and types of people.

Medications listed were of all sorts and varieties. Antibiotics, tranquilizers, sedatives, cardiotonics, diuretics and hormones had been ordered. A few patients had several oral medications to be taken several times a day, while others had only one oral medication to take one or more times per day.

Data Analysis

The first set of questions on the interview guide was to determine whether the location of the medication was be-
ing used as a retrieval cue.

<table>
<thead>
<tr>
<th>Location</th>
<th>No. of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. bedside</td>
<td>9</td>
</tr>
<tr>
<td>B. kitchen table</td>
<td>8</td>
</tr>
<tr>
<td>C. kitchen counter</td>
<td>7</td>
</tr>
<tr>
<td>D. kitchen cabinet</td>
<td>6</td>
</tr>
<tr>
<td>E. bathroom medicine cabinet</td>
<td>5</td>
</tr>
<tr>
<td>F. pocket</td>
<td>4</td>
</tr>
<tr>
<td>G. purse</td>
<td>3</td>
</tr>
<tr>
<td>H. in the open where it is easily observable</td>
<td>2</td>
</tr>
<tr>
<td>I. in the room where patient spends most of the day</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure I. - Number of Patients Using Various Locations as Retrieval cues

* A. bedside
B. kitchen table
C. kitchen counter
D. kitchen cabinet
E. bathroom medicine cabinet
F. pocket
G. purse
H. in the open where it is easily observable
I. in the room where patient spends most of the day

64% of the patients claimed to keep the medication in the open where it is easily observable. This category includes the greatest number of both males (42.8%) and females (75%).

The next most significant percentage associated with location, is 35.7% of the patients that keep the medication in the room in which they spend most of their day. 50% of
the females and only 14.2% of the males are included in the category. It is possible that these figures reflect the fact that most of the women may be at home and indoors more than males.

The location least likely to serve as a retrieval cue is the bathroom medicine cabinet, yet, two patients indicated keeping the medication there. Also, behind doors, not easily observable would be that in the kitchen cabinet. Only females (25%) kept the medication there. In this case, even though not being observable, it may still be an acceptable cue since a woman may open the cabinet door several times a day.

Location can be considered a retrieval cue according to this data. The data collected indicates the most important aspect of location to be that the medication be observable. Various specific locations of having it in the open were chosen. It is possible that the specific location depends on the time the medication is to be taken. For instance the before sleep medication may be kept at the bedside and medication to be taken with meals, kept on the kitchen table. Interesting is the fact that an equal number of both males and females keep the medication in the kitchen.

Percentages cited may not add up to 100% since several patients were taking more than one medication. Diversity of locations may reflect medication taken at different times of the day.
Males and females equally use at least one location as a retrieval cue. The percentage is very high at 92.8%. The high percentage noted include patients using at least one location as a retrieval cue. It must be noted here that some patients on more than one medication listed the use of more than one location for medications.

Data gathered from the next portion of the interview guide was intended to show whether the visual image of the medication was easily recalled, and hence, used as a retrieval cue.
The recall of color and shape images of the oral medication were high for both males (85.7%) and females (87.5%). These characteristics were also equal at 92.8% of the patients interviewed recalling them. 78.5% of the patients could visualize the form of the medication. Only 50% could recall the company markings on the medication.

The data shows that the visual image is easily recalled for color, shape and in most cases, form. Special company markings, however, were not as easily recalled. Males and females closely correlated as to the images recalled.

![Bar chart showing the recall of different physical characteristics of medication]

**Figure IV.** - Patients' Indication of the Use of a Physical Characteristic as a Retrieval Cue.

It was found that few patients were conscious of using the physical characteristics of the medication as a retrieval cue to the recall of taking that medication. Only 35.7% consented to using the form of the medication, while as little as 7.14% used color and shape.

Not one patient indicated using the company marking on the medication to recall taking the medication. This
data correlates with the previous data collected indicating that few patients remembered the correct markings on the medication.

Recall of physical characteristics of the container was questioned in section IV of the interview guide. All but one patient could visualize the color, material, shape, and special markings. That one female patient did not know the material of the container.

It is interesting to note that the majority of the containers were plastic (92.8%), colored (64.2%), and of the straight bottle shape (64.2%). Very few patients recognized characteristic markings of the container. A colored lid was noted by 21.4% of the patients, a plastic lid by 35.7% of the patients and a colored label by 7.14% of the patients. These figures do not correspond with other physical characteristics questioned just prior to characteristic markings. For instance, 98.2% of the containers were plastic but only 35.7% had plastic lids. It is reasonable to assume that a plastic container would have a plastic lid. Also, 64.2% of the answers listed the container as being colored while only 21.4% noted a colored lid. It is possible that a colored bottle would have a white lid, however, one would assume a colored bottle to have the same color lid. Perhaps the suggestion of a colored lid, plastic lid, colored label and imprint being characteristic marking of the container was misleading.

The high percentages of visualization of the physical characteristics of the container reflect a greater recall
than for physical characteristics of the medication itself. Perhaps the container is a more significant retrieval cue to taking prescribed oral medication than the medication itself. One patient identified the shape of the container as helping her recall which medication to take at what time.

The data gathered revealed few people using any specific system to recall to take their prescribed oral medication. Only 7.14% used special cups or containers, and 14.2% placed the medication in a special container for travel. Males using a system rank at 28.5% while females rank lower at 12.5%. Earlier research indicated that the use of a specific system to recall taking medication is more accurate, yet, few of the subjects tested here use any system.

25% of the females and 14.2% of the males are reminded by their families to take the medication. These figures indicate that the majority must recall to take the medication on their own yet, do not use any specific system.

<table>
<thead>
<tr>
<th>No. of Patients</th>
<th>Yes</th>
<th>No</th>
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<tbody>
<tr>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
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<tr>
<td>6</td>
<td></td>
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<td>5</td>
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<td>4</td>
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</table>

Figure V. - Comparison of Patients' Opinion of Suggested Retrieval Cues Given in the Future by Physicians

An equal number of patients (50%) indicated a physician's suggestion of retrieval cues to be useful as indicated
the opposite. Among the patients, however, the sexes differed. 59.1% of the males indicated suggested retrieval cues to be useful compared to 28.5% indicating the suggestions to have no use. Females on the other hand gave 62.5% denials of the use of suggested retrieval cues compared to 39.5% in favor of the suggestions.

Table 1 gives a concise picture of the use of retrieval cues for the recall of taking prescribed medication, as found by this study.

**TABLE 1**

<table>
<thead>
<tr>
<th>SUMMATION OF USE OF RETRIEVAL CUES</th>
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<tbody>
<tr>
<td><strong>Sampled</strong></td>
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<tr>
<td><strong>No.</strong></td>
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<tr>
<td>Physical Characteristics</td>
</tr>
<tr>
<td>Location</td>
</tr>
<tr>
<td>Container Characteristics</td>
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<tr>
<td>Specific System</td>
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</table>

Considering the hypothesis stated earlier, that the patients interviewed from the Family Practice Clinic will use one or more of the suggested retrieval cues, one finds this to be true. However, the sub-hypotheses were not all proven correct. Container characteristics were used more often as retrieval cues than was the hypothesized location. It was, also, not generally noted that more females used retrieval cues than males. The differing use according to sex depended on the specific cue. The patients interviewed
divided evenly as to whether suggestions of retrieval cues should be made by physicians.

Corresponding with the sub-hypothesis of a specific system being the least used retrieval cue is the data presented. A specific system rated the lowest percentage of use by both men and women.
CHAPTER III

SUMMARY AND CONCLUSIONS

Problem and Methodology

The problem studied was: Are retrieval cues, to recall taking prescribed oral medication, used by the forty to seventy year old residents of Muncie, Indiana, who are attending the Family Practice Clinic?

Patients in the stated age range visiting the clinic, were interviewed during the first two weeks of April, 1972, on Monday, Tuesday, and Thursday from 10:00 AM to 2:00 PM. An interview guide was used as the data gathering tool. The investigator of this study was the sole interviewer.

Findings

The data gathered indicated that patients do use retrieval cues to recall taking prescribed oral medication. Of the suggested retrieval cues, the container characteristics of the medication were used most often. Location and physical characteristics of the medication were the next most used retrieval cues. Specific systems were the least used retrieval cue.

Also noted in the study was the fact that females did not use retrieval cues more than males. The sexes differed only in the selection of the retrieval cues used.

Of the total patients interviewed, half indicated that a suggestion of a retrieval cue made by a physician,
would be useful. The other half indicated that the suggestion would not be useful.

Conclusions and Recommendations

The investigator concludes that retrieval cues are used by patients at the Family Practice Clinic. Although this is true for location, and physical characteristics of both the container and the medication, the use of specific systems to remember is seldom.

Studies have shown that the use of a specific system is beneficial to the recall of taking medication. 22, 23, 24 Patients who feel a suggested retrieval cue by the physician would be useful are not a majority but only half. Even though this is true physicians might keep the felt need of these people in mind. The investigator feels that a lack of education on the subject, and the idea of being told how to recall, may have left the patient a little unsure of the usefulness of retrieval cues.

It must be kept in mind that a larger sampling of patients, a different population, or different locale may alter any findings presented at this time.

22Neely and Patrich, op. cit., p. 54.
23McInnis, op. cit., p. 2152.
APPENDIX
TABLE 2
DETERMINATION OF LOCATION AS A RETRIEVAL CUE TO THE RECALL
OF TAKING PRESCRIBED ORAL MEDICATION

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<thead>
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<th>Patient Number</th>
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</table>

+ male
++ female

*A. bedside
B. kitchen table
C. kitchen counter
D. kitchen cabinet
E. bathroom medicine cabinet
F. pocket
G. purse
H. where it is easily observable
I. in the room where the patient spends most of
his day
TABLE 3

DETERMINATION OF PHYSICAL CHARACTERISTICS AS RETRIEVAL CUES TO THE RECALL OF TAKING PRESCRIBED ORAL MEDICATION

<table>
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<tr>
<th>PATIENT NUMBER</th>
<th>FORM</th>
<th>COLOR</th>
<th>SHAPE</th>
<th>MARKINGS</th>
<th>PATIENT OPINION*</th>
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*1. color
2. shape
3. form
4. markings

++ correct or yes male answer
+ correct or yes female answer
- incorrect male answer
-- incorrect female answer
**TABLE 4**

DETERMINATION OF THE CONTAINER AS A RETRIEVAL CUE TO THE RECALL OF TAKING PRESCRIBED ORAL MEDICATION

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</table>

+ male correct answer
++ female correct answer
-- female incorrect answer

*A. color
1. colored
2. clear
3. white
B. material
1. plastic
2. glass
3. paper
C. shape
1. 
2. 
3. 
4. 
D. characteristic markings
1. colored lid
2. plastic lid
3. colored label
4. imprint
E. Patient's indication of use of container as retrieval cue
1. color
2. material
3. shape
4. characteristic markings
TABLE 5

DETERMINATION OF A SPECIFIC SYSTEM AS A RETRIEVAL CUE TO THE
RECALL OF TAKING PRESCRIBED ORAL MEDICATION

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*A. a calendar with pills stapled on
B. a calendar with hints written on
C. special cups or containers
D. specific order
E. rubberbands around the container
F. special container for travel
G. family as a reminder
<table>
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+ male yes answer
- male no answer
++ female yes answer
-- female no answer
BIBLIOGRAPHY


Blake, Thomas, Medical Communications Associate of Roche Laboratories. Personal letter, 24 February 1972.

Creamer, Elizabeth. Family Practice Clinic, Muncie, Indiana. Interview, 22 February 1972.


Koenker, Robert H. "How to Write a Term Paper, Graduate Course Paper, Research Paper, Thesis, or Creative Project." Faculty suggestions, Ball State University, Muncie, Indiana.


Spaulding, L. Bayard, Medical Communications of the Upjohn Co. Personal letter, 22 February 1972.
