Spaced Retrieval Training to Assist in Wayfinding for Long-Term Care Residents with Dementia

THESIS

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By

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ABSTRACT

The purpose of this study was to determine the effectiveness of Spaced Retrieval (SR) training to assist in wayfinding for long-term care residents with dementia. SR training sessions were analyzed for three individuals with dementia to document the impact of SR training on expected response mastery and generalization to physically going to their room. Results revealed an absence of mastery across in all three participants with the given criterion. There was limited evidence of generalization outside of the training sessions for not yet mastered expected responses. However, anecdotal reports from nursing staff were provided stating an increase in wayfinding abilities.
This effort is dedicated to my partner and best friend, my husband. Greg, you have provided endless support and love throughout this entire process and that has meant so much.
ACKNOWLEDGEMENTS

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To my parents and my family, thank you for all of the love and support you have always given me throughout all of my endeavors.

A warm thank you to the long-term care facility, their staff, the participating residents and their families. It was a privilege to work with you all.
VITA

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Fields of Study

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# TABLE OF CONTENTS

ABSTRACT................................................................................................................................. ii

ACKNOWLEDGEMENTS ........................................................................................................ iv

VITA ........................................................................................................................................ v

TABLE OF CONTENTS .............................................................................................................. vi

LIST OF TABLES ....................................................................................................................... viii

LIST OF FIGURES ..................................................................................................................... ix

INTRODUCTION ....................................................................................................................... 1

METHOD ..................................................................................................................................... 7

Setting ....................................................................................................................................... 7

Participants ............................................................................................................................... 7

Design ....................................................................................................................................... 8

Screening Procedures .............................................................................................................. 9

Baseline Procedures .............................................................................................................. 9

SR Training Procedures ....................................................................................................... 10

Generalization Procedures ................................................................................................. 12
Results

Effects of SR Training to Assist in Wayfinding for Long-Term Care Residents with Dementia

FCV#004

FCV#005

FCV#007

Discussion

Effects of Spaced Retrieval (SR)

Limitations and Future Research

Conclusions

References

Appendix A: Consent Form

Appendix B: HIPAA Authorization Form

Appendix C: Spaced Retrieval Protocol

Appendix D: Nursing Staff Data Collection Form

Appendix E: Sample Spaced Retrieval Data Collection Form
LIST OF TABLES

Table 1. Demographics .................................................................................................................. 8
Table 2. Screening Measures ......................................................................................................... 9
Table 3. Summary of SR Training Sessions and Response Mastery ............................................. 14
Table 4. Goal Prompt & Response Summary of SR Sessions, Highest Successful Interval for FCV#004 ........................................................................................................................................ 17
Table 5. Goal Prompt & Response, Summary of SR Sessions, Highest Successful Interval for FCV#005 ........................................................................................................................................ 19
Table 6. Goal Prompt & Response, Summary of SR Sessions, Highest Successful Interval for FCV#007 ........................................................................................................................................ 21
LIST OF FIGURES

Figure 1. Baseline Data, Training Data, & Generalization Data for FCV#004, FCV#005, & FCV#007

15
INTRODUCTION

Many long-term care facilities provide housing and services for older adults who have some level of dementia. Dementia results from organic changes in the brain which are acquired, progressive, and diffuse. The current definition of dementia (Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), American Psychological Association, 1994) requires the individual to present with memory impairments in addition to cognitive changes in language, problem solving, or executive function which are severe enough to negatively impact daily function. An overt decline in daily function for social and occupational activities accompanies memory and cognitive impairments (Bourgeois & Hickey, 2009). Individuals with dementia have a decreased ability to recall short term memory information as well as reduced ability to organize information for the execution of planning and problem solving/reasoning. Deficits in memory, thinking, judgment, language can lead to challenging behaviors that the long-term care facility staff has to mitigate. These behaviors can include: repetitive questioning, loss of information or material possessions, and disorientation within ones environment. The problem of spatial disorientation is an added challenge for the long-term care staff to manage. Residents with dementia can find themselves in an unfamiliar environment and are unable to remember the new information that they were presented with regarding the new setting. Staff may be unable to effectively orient and help these residents. Management
of these problem behaviors creates daily challenges which increase resident interaction
time with the staff. This creates additional time demands for staff that are required to
meet the daily healthcare needs of all other residents that make up a staff member’s case
load.

Memory refers to a person’s ability to recall recently learned information, personal experience, and repetitive procedural tasks. Squire (2004) identified two different memory processes based on the different kinds of information processed and underlying principles that govern them: declarative and non-declarative memory. Declarative memory is composed of episodic (memory of events) and semantic (word meaning) information. Deficits of declarative memory include failure to remember specific events from the past and word-finding difficulties, and are often some of the earliest occurring and most impaired memory processes. Non-declarative memory involves the ability to make associations between concrete and abstract information pertaining to an event, and is thought to involve unconscious encoding and recall of information (Schacter, 1987). Procedural memory, a component of non-declarative memory involves the encoding and retrieval of habitual information, such as how to feed oneself, and is relatively preserved until the later stages of the disease due to repetition priming, motor learning, and classical conditioning which provide a basis for successful implementation of compensatory strategies.

People with dementia often become confused within familiar and unfamiliar environments which can impact their well-being and safety. Perception and comprehension of information in the environment is compromised due to memory and
cognitive impairments which may lead to spatial disorientation. Orientation refers to one’s ability to recognize and relate information such as person (self vs. others), place (current location vs. a destination), time (month, day, and year), and space (relationships and references) within the environment. Wayfinding difficulties can be a product of spatial disorientation. Wayfinding is a specific term used to describe a person’s ability to find their way from one place to another utilizing environmental cues and knowledge from previous experience. It requires perception of surroundings, ability to plan a route, execution of the plan, and problem solving/reasoning. Rainville and colleagues (2001) stated the ability to orient oneself, “…would assume an ability to recall at least some past experience and the capacity to register new data.” Disease progression often leads to increased confusion, reduced mobility, and loss of independence (Nolan, 2002). Residents with dementia can struggle to consistently locate their rooms and continually ask the long-term care staff for assistance. In addition, accidental trespassing can occur when a resident incorrectly identifies a room as their own. Both situations cause distress and agitation for the individual with dementia and the other residents, as well as frustration of the staff feeling. The decreased wayfinding abilities result in increased need for staff assistance. This increased demand for time and attention from the staff can detract from multiple resident care and administrative responsibilities. The challenge lies in finding an effective way of teaching residents with dementia how to routinely find their room without staff assistance.

Environmental modifications can often improve this challenging problem for both the residents and staff (Brush & Calkins, 2008). Architectural layout was examined and
showed that residents with moderate to severe dementia had increased wayfinding difficulty when the spatial layout complexity increased (Marquardt & Schmieg, 2009). These findings were reinforced in a study that showed the combination of environmental cues and floor plan layout supported wayfinding abilities (Marquardt & Gesine, 2011).

Memories from youth/early adulthood are retained the longest in people with dementia (Sartori, Snitz, Sorcinelli, & Dunn, 1991). People with dementia will sometimes be unable to recognize current pictures of themselves but correctly identify themselves in pictures from their youth/early adulthood. A study utilizing external orientation cues that consisted of a resident’s printed name paired with a portrait-like photograph of the resident from early adulthood showed a 50% mean increase in the residents’ accurate wayfinding (Nolan, Mathews, & Harrison, 2001). This idea was also explored utilizing personal items and pictures from a resident’s youth/early adulthood that were placed inside memory boxes located outside the resident’s door and results showed a 45% mean increase in wayfinding for the residents in the study (Nolan, Mathews, Truesdell-Todd, & VanDorp, 2002). These studies all looked at environmental cues to increase wayfinding ability but did not explore ways in which to teach the residents how to use and remember the environmental cues. Training with the use of other types of external aids/cues, such as written cue cards, memory books, log books, calendars or planners have been shown to compensate for a variety of memory impairments including word and name retrieval (Bourgeois et. al., 2003). To date, there has not been a study exploring the potential for training the independent use of external memory aids to support successful wayfinding by persons with dementia.
Spaced Retrieval (SR) is a technique which can be used to train people with dementia to recall tasks dependent upon procedural memory and to use external memory aids independently (Brush & Camp, 1998). The goal of SR is to enable new information to be encoded into memory and retained for long periods of time, such as hours, days, and weeks. The concept of “errorless learning” provides the rationale behind training in use of external memory aids through SR. In an SR training session, the client is taught specific information by answering a question correctly with increasing intervals between each question; if the client does not immediately answer the question, the clinician states the target response and requires an immediate repetition by the client. This prevents the client from guessing or making an incorrect response, resulting in errorless performance (Brush & Camp, 1998). Research on the SR technique using errorless learning principles has shown that repetition and successful practice of salient information increase access to declarative memory through non-declarative processes and the learning of a variety of target goals (Bourgeois et. al., 2003; Hopper et al., 2005). For example, goals trained with Spaced Retrieval demonstrated significantly more immediate and long-term gains than goals trained with a cueing hierarchy approach that did not prevent errors during training (Bourgeois, et. al., 2003).

The purpose of this study is to investigate if Spaced Retrieval (SR) training can be an effective treatment for people with dementia that are exhibiting wayfinding issues. The benefit for the person with dementia is increased independence and decreased reliance on long-term care facility staff. Successful SR training would additionally benefit the long-term care facility staff by reducing the number of demands placed on
them and allowing for more efficient care to all residents. The specific research question addressed was:

1. Will people with dementia demonstrate goal mastery and generalization of a wayfinding goal with Spaced Retrieval training?
METHOD

Setting

The study was conducted in a 36 bed dementia care unit (DCU) of a residential nursing home, located in a suburb of Columbus, Ohio. It was a secured unit serving older adults who demonstrate mild to severe signs and symptoms of dementia. The DCU was composed of three wings, termed cottages at this facility. Each cottage contained 12 resident rooms, a common sitting area, and a dining room. A large common area at the entrance of the unit served as an activity space and connected the three cottages. Cottages were each identified by a colored symbol (red rose, yellow sun, or blue bird). Each different symbol was displayed on a wall at the entrance to the cottage area for the purpose of guiding the resident to his or her personal living space. Additional signage was placed to one side of the door frame for each single occupancy room. The five inch by seven inch black and white sign displayed the colored symbol for the particular cottage, the specific room number, and a personal photograph of the resident.

Participants

Residents demonstrating wayfinding difficulty were identified by nursing staff. Consent forms (Appendix A) were distributed to their family members or guardians and signed prior to enrollment in the study. The following criteria was used for selection of candidates: qualified candidates had to reside on the DCU, have been identified by
nursing staff as having difficulty finding his or her room, and be ambulatory within the unit independently or with independent utilization of adaptive equipment. Medical charts of the qualifying candidates were reviewed to confirm a diagnosis of dementia and document demographic information. Table 1 contains the demographic information about the participants. As shown in Table 1, the three participants’ age ranged from 75-94 and they were all females.

Table 1. Demographics

<table>
<thead>
<tr>
<th>Subject</th>
<th>Gender</th>
<th>Age</th>
<th>Dementia Dx</th>
<th>Race</th>
<th>Primary Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCV#004</td>
<td>F</td>
<td>76 y.o.</td>
<td>Yes</td>
<td>White</td>
<td>Standard American English</td>
</tr>
<tr>
<td>FCV#005</td>
<td>F</td>
<td>94 y.o.</td>
<td>Yes</td>
<td>White</td>
<td>Standard American English</td>
</tr>
<tr>
<td>FCV#007</td>
<td>F</td>
<td>75 y.o.</td>
<td>Yes</td>
<td>White</td>
<td>Standard American English</td>
</tr>
</tbody>
</table>

**Design**

This study used a multiple baseline, ABA design across subjects to evaluate Spaced Retrieval training for wayfinding by individuals with dementia. A total of three participants from a group of six consenting residents were randomly assigned to the SR training for room finding. The study consisted of Baseline, Training, and Generalization. The dependent variable for training was the targeted verbal response (ex. “Bird 14”) and successful independent room finding was the dependent variable for baseline and generalization.
Screening Procedures

The Mini Mental State Exam (MMSE; Folstein, Folstein, & McHugh, 1975) was administered to each candidate for assessment of cognitive function; a score <24 out of 30 was required to confirm cognitive impairment. Functional Vision, Hearing, and Communication Screening Measures (Bourgeois et. al., 2001) were collected to determine ability to participate in training. The criteria of inclusion was a rating of adequate vision, adequate hearing, and a score > 4 (Phrases, multiword only). Additionally, the investigator administered the Spaced Retrieval Screen (Brush & Camp, 1998) to candidates meeting the above criteria; a passing score was demonstrated by stating the correct information after a 1 min interval. Table 2 contains the screening results of the participants. As shown in Table 2, their MMSE scores ranged from 1-21 (maximum score = 30).

Table 2. Screening Measures

<table>
<thead>
<tr>
<th>Subject</th>
<th>MMSE Score (Maximum=30)</th>
<th>Vision</th>
<th>Hearing</th>
<th>Communication Rating 1-6</th>
<th>SR Screen</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCV#004</td>
<td>4</td>
<td>Adequate</td>
<td>Adequate</td>
<td>6 (1 = no response, 6 normal)</td>
<td>Passed</td>
</tr>
<tr>
<td>FCV#005</td>
<td>21</td>
<td>Adequate</td>
<td>Adequate</td>
<td>6</td>
<td>Passed</td>
</tr>
<tr>
<td>FCV#007</td>
<td>1</td>
<td>Adequate</td>
<td>Adequate</td>
<td>6</td>
<td>Passed</td>
</tr>
</tbody>
</table>

Baseline Procedures

Two graduate students served as investigators in this study in order to provide daily training sessions to the participants. This investigator and the second researcher
reviewed all data collection, treatment procedures, and established reliability prior to the start of the study.

The baseline phase of the study started after all consenting residents had been screened and randomly assigned to one of the two studies. The investigator located the participant in the DCU and provided an initial verbal stimulus, “Show me your room?” as a request for the participant to physically take the investigator to their room. The participants were not provided any directional assistance from the investigator and were given three minutes to fulfill the request. Investigators collected baseline data once a day over the course of a week for a minimum of 3 days and to establish a low and stable rate of performance.

Baseline data was collected by the nursing staff on the DCU and by research staff for purposes of reliability and validity. The nursing staff was individually consulted to explain the parameters of the study and the need for their participation in baseline collection. The nursing staff was provided a data collection form (Appendix D) to track the number of times each resident was able or unable to find their room without assistance. The provided form listed each participant’s name and included two columns: (1) successful wayfinding attempt within 3 minutes; (2) unsuccessful wayfinding attempt within 3 minutes. This initial data was collected as baseline by the nursing staff for one week.

**SR Training Procedures**

When the first participant demonstrated a low and stable baseline, the training phase began. Training sessions occurred at least four days per week at the assisted living
facility in the DCU. The anticipated time for each training session was 30 minutes; however, actual session duration varied due to a variety of participant factors. The goal of SR training was to locate their room by looking for the symbol for their designated wing (ex. sun, flower, bird). The investigator explained to the participant the purpose of the training and discussed their room location in order to determine the participant’s terminology for describing their room location. Each session began with a verbal prompt question and response; example: “When I ask you, “What is your room?” I want you to say, “Bird 14.”” The verbal prompt and response was created using the preferred vocabulary and phrasing of the participant. A SR Data Sheet (see Appendix E) was used to record participant response accuracy. If the participant immediately produced the correct response following the question prompt the next presentation of the question prompt was delivered after an interval of time. This time interval increased with each consecutive correct response from the participant. The increased time interval increments between 0 seconds and 30 seconds varied, depending on the participants. Following the 30 second time interval each proceeding time interval was a double of the previous interval up to sixteen minutes. Participant responses were recorded as correct if it was an immediate response; all delayed responses were recorded as incorrect. If the participant did not give the correct response then the investigator modeled the expected response and returned to the time interval of the last correct response. During the intervals of time unstructured non-training related conversation took place between the investigator and the participant. If the participant was not progressing during the training session an index card was provided to them and they were instructed to look at the card for the prompt
response. At the end of each training session the participants were asked by the investigators to find their room unassisted. The expected verbal response was considered mastered when the participant was able to give the expected response after a 24 hour time period on two consecutive training sessions. After the mastery of the response the training was discontinued. Additionally, training was discontinued if the participant plateaued or regressed in progression over five consecutive training sessions.

**Generalization Procedures**

After training ended, investigators collected generalization data once a day over the course of one week. The investigator located the participant in the DCU and provided an initial verbal stimulus, “Show me your room?” as a request for the participant to physically take the investigator to their room. The participants were not provided any directional assistance from the investigator and were given three minutes to fulfill the request. The nursing staff was individually consulted to re-establish their understanding of the parameters of the study and the need for their participation in generalization data collection. The nursing staff was provided a data collection form (Appendix D) to track the number of times each resident was able or unable to find their room without assistance. The provided form listed each participant’s name and included two columns: (1) successful wayfinding attempt within 3 minutes; (2) unsuccessful wayfinding attempt within 3 minutes. The goal was to have this generalization data collected for one week. However, the nursing staff was non-compliant and did not record any generalization data for the study. Data forms were provided to the nursing staff over two consecutive weeks with no results.
Reliability

Two investigators participated in the data collection for this study. Each investigator conducted SR training sessions and were trained on the protocol (Appendix C) prior to initiating the training sessions with the participants. Each training session took place with only one investigator present. All sessions were recorded using an Olympus digital audio recorder. Files were downloaded at The Ohio State University Speech-Language-Hearing Clinic. Original files were then erased from the audio recorder. There were a total of 59 recorded SR training sessions. Inter-rater reliability was assessed for 20% (12/59 sessions) of all training sessions to ensure appropriate recording of the participants’ responses. The reliability for appropriate response recording was calculated by comparing the marked responses (correct or incorrect (+ or -)) for each trial within a training session. This procedure yielded overall agreement scores above 80%, range of agreement was 50%-100%, and the mean was 90.6%.
RESULTS

Effects of SR Training to Assist in Wayfinding for Long-Term Care Residents with Dementia

A summary of the SR training for each participant is shown in Table 3 and includes: total number of sessions, total number of trials, and mastery of goal. Due to the variations between each participant a case history is provided for each participant. Table 4 through Table 6 show each individual participant’s SR prompt, expected response, sessions, number of trials, correct and incorrect responses, as well as the highest successful interval achieved for each session. Figure 1 shows the overall performance for each participant. The nursing staff collected baseline data was found to be inconsistent and its reliability was questionable. Therefore, this data is not included below.

Table 3. Summary of SR Training Sessions and Response Mastery

<table>
<thead>
<tr>
<th>Subject</th>
<th># of Sessions</th>
<th># of Trials</th>
<th>Mastery</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCV#004</td>
<td>7</td>
<td>55</td>
<td>No</td>
</tr>
<tr>
<td>FCV#005</td>
<td>20</td>
<td>121</td>
<td>No</td>
</tr>
<tr>
<td>FCV#007</td>
<td>5</td>
<td>85</td>
<td>No</td>
</tr>
</tbody>
</table>
Figure 1: Baseline Data, Training Data, & Generalization Data for FCV#004, FCV#005, & FCV#007

Figure 1: N = No (Participant did not independently find room within three minutes.), Y = Yes (Participant did independently find room within three minutes).
FCV#004

FCV#004 is a 76 year old white female whose primary language is English and has a diagnosis of dementia and hypertension. This participant received a score of 4 (maximum=30) on the MMSE, had adequate vision and hearing, scored a communication rating of 6 (normal conversation), and showed evidence of learning through the SR screen. She participated in SR training for a total of 7 sessions which consisted of a total of 55 trials as shown in Table 3. The goal prompt for FCV#004 was “What is your room?” with the expected response being “Bird 14”. The highest successful interval reached was 30 seconds. Her progression throughout the training sessions is shown in Table 4 and Figure 1. Barriers faced when training this participant included agitation as well as refusal to participate. Facilitation for these barriers included simplifying the language used and allowing conversation to be participant driven. Despite these facilitation measures this participant became increasingly uninterested in training and the sessions were therefore discontinued. Although mastery was not reached, staff reported that her requests for wayfinding decreased throughout the training period.
Table 4. Goal Prompt & Response Summary of SR Sessions, Highest Successful Interval for FCV#004

<table>
<thead>
<tr>
<th>Goal Prompt</th>
<th>Goal Response</th>
<th>Session</th>
<th>Trials</th>
<th>Correct Responses</th>
<th>Incorrect Responses</th>
<th>Highest Successful Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where is your room?</td>
<td>Bird 14</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>4</td>
<td>30 seconds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>0 seconds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>9</td>
<td>4</td>
<td>5</td>
<td>5 seconds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>11</td>
<td>7</td>
<td>4</td>
<td>20 seconds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>10 seconds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td>12</td>
<td>6</td>
<td>6</td>
<td>10 seconds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>20 seconds</td>
</tr>
</tbody>
</table>

FCV#005

FCV#005 is a 94 year old white female whose primary language is English and has a diagnosis of Alzheimer’s disease. This participant received a score of 21 (maximum=30) on the MMSE, had adequate vision and hearing, scored a communication rating of 6 (normal conversation), and showed evidence of learning through the SR screen. She participated in SR training for a total of 20 sessions which consisted of a total of 121 trials as shown in Table 3. The SR question prompt for FCV#005 initially was “What is your room number?” with the expected response being “Sun 35”. The participant frequently gave the response “35” so the SR question prompt was changed to “What is your room?.” With this SR question prompt modification, the participant’s frequency increased in correct expected response use. The highest successful interval reached was 16 minutes. However, she was never able to successfully retain the expected
response over a 24 hour period. Her progression throughout the training sessions is shown in Table 5 and Figure 2. Barriers faced when training this participant included alertness as well as absence from the facility. Facilitation for these barriers included simplifying the language used, arousing the participant 10 minutes prior to session initiation, allowing conversation to be participant driven, and attempts to identify regularly scheduled activities that removed her from the facility. These facilitation measures were inconsistent in effectiveness. Although mastery was not reached, she did successfully find her room twice during the generalization phase. Staff reported that her ability to locate her room independently increased. An increase in her ability to successfully find her room was also noted from baseline to generalization phases.
Table 5. Goal Prompt & Response, Summary of SR Sessions, Highest Successful Interval for FCV#005

<table>
<thead>
<tr>
<th>Goal Prompt</th>
<th>Goal Response</th>
<th>Session</th>
<th>Trials</th>
<th>Correct Responses</th>
<th>Incorrect Responses</th>
<th>Highest Successful Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>What is your room number?</em></td>
<td><em>Sun 35</em></td>
<td>1</td>
<td>19</td>
<td>10</td>
<td>9</td>
<td>1 minute</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>3</td>
<td>4</td>
<td>1 minute</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>7</td>
<td>1</td>
<td>2 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>12</td>
<td>6</td>
<td>6</td>
<td>4 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>12</td>
<td>7</td>
<td>5</td>
<td>8 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>2 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>8 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>4 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>8 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>8 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>8 minutes</td>
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<td></td>
</tr>
<tr>
<td>12</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>16 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>4 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>8 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>7</td>
<td>4</td>
<td>3</td>
<td>8 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>8 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>16 minutes</td>
<td></td>
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<tr>
<td>18</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>16 minutes</td>
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<tr>
<td>19</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>4 minutes</td>
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<td></td>
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<tr>
<td>20</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>8 minutes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
FCV#007

FCV#007 is a 75 year old white female whose primary language is English and has a diagnosis of dementia. This participant received a score of 1 (maximum=30) on the MMSE, had adequate vision and hearing, scored a communication rating of 6 (normal conversation), and showed evidence of learning through the SR screen. She participated in SR training for a total of 5 sessions which consisted of a total of 85 trials as shown in Table 3. The SR question prompt for FCV#007 was “What is your room number?” with the expected response being “Rose 35”. The highest successful interval reached was 8 minutes. Her progression throughout the training sessions is shown in Table 5 and Figure 2. The barriers faced when training this participant was reduced attention. Facilitation for this barrier included simplifying the language used and investigator guided conversation. These facilitation measures were moderately consistent in effectiveness. Mastery was not reached, nor did staff report that her ability to locate her room independently increased. Her ability to successfully find her room was not decreased from baseline to generalization phase; however, the one successful data point in baseline is possibly an anomaly.
Table 6. Goal Prompt & Response, Summary of SR Sessions, Highest Successful Interval for FCV#007

<table>
<thead>
<tr>
<th>Goal Prompt</th>
<th>Goal Response</th>
<th>Session</th>
<th>Trials</th>
<th>Correct Responses</th>
<th>Incorrect Responses</th>
<th>Highest Successful Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>What is your room number?</em></td>
<td><em>Rose 9</em></td>
<td>1</td>
<td>25</td>
<td>13</td>
<td>12</td>
<td>1 minute</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>30</td>
<td>15</td>
<td>15</td>
<td>1 minute</td>
</tr>
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<td></td>
<td></td>
<td>3</td>
<td>12</td>
<td>7</td>
<td>5</td>
<td>2 minutes</td>
</tr>
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<td></td>
<td></td>
<td>4</td>
<td>7</td>
<td>4</td>
<td>3</td>
<td>2 minutes</td>
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<tr>
<td></td>
<td></td>
<td>5</td>
<td>11</td>
<td>7</td>
<td>4</td>
<td>8 minutes</td>
</tr>
</tbody>
</table>
DISCUSSION

Effects of Spaced Retrieval (SR)

The primary focus of this study was to determine the effectiveness of the SR training for teaching room finding goals to individuals with dementia residing in long-term care facilities as well as document any evidence of generalization. Goal mastery was not achieved by any of the participants and there was limited evidence of learning in only one of the three participants when the generalization data was compared to the baseline data.

The baseline data, training data, and generalization data are displayed in Figure 1. Only one participant showed was able to find their room independently during baseline. This success is a noted anomaly when compared to the remaining baseline data for this participant. The number of training sessions and the highest successful interval reached varied for each participant. None of the participants obtained goal mastery. Only one participant showed minimal evidence of generalization.

The results of the study were unexpected given the existing literature. Prior research has shown Spaced Retrieval to be a successful intervention for people with dementia (Bourgeois et. al., 2003; Hopper et al., 2005). Despite the documented cognitive impairments that the participants in this study had, it was expected that the SR training technique would allow them to learn new information and retain it over time.
Despite measures taken to control expected variables throughout the study, the predicted variables and unexpected variables created barriers in the study. These barriers are suspected to be the cause of the discrepancy in the results of this study and the existing literature.

There were several possible factors that could explain the discrepancy in results compared to the existing literature. The total number of training sessions varied between participants for reasons specific to each participant. The barriers and total number of training sessions for each participant may have affected their ability to reach the goal. FCV#004 presented barriers that included agitation and refusal to participate. These barriers attempted to be facilitated through simplification of the language used and participant led conversation. These facilitation attempts proved ineffective and the participant increased in her refusal to participate in training sessions. A total of five training sessions took place; however they were not consecutive due to the above noted barriers. FCV#004 did not show a positive progression across the training sessions and her increased frequency of training session refusal resulted in the discontinuation of her SR training. FCV#005 presented fewer barriers and received the most training sessions, 20 training sessions in total, of the three participants. The barriers she presented with included reduced alertness as well as absence from the facility. These barriers were facilitated through simplifying the language used, arousing the participant 10 minutes prior to session initiation, allowing conversation to be participant driven, and attempts to identify regularly scheduled activities that remove her from the facility. Her training sessions were not consecutive due to these barriers; however, a positive progression was
noted across the training sessions. FCV#007 was added to the participant pool late in the data collection process. This was the main reason that she only received a total of seven training sessions. The barriers present with this participant included reduced attention and restricted availability; facilitation involved simplifying the language used, investigator guided conversation, and attempts to identify scheduled visitations. The attention barrier did not affect the amount of training sessions conducted with this participant. However, unplanned visitations did and also resulted in training sessions being non-consecutive. There was a positive increase in progression across the training sessions despite mastery of the goal not being achieved.

The goal prompt and goal response was tailored for each participant based on the barriers and needs identified by the investigators. This alteration to meet the need of each participant resulted in a lack of goal prompt and response continuity between participants. Despite the absence of goal mastery of the goal across all three subjects, there was an increase in the ability of FCV#005 and FCV#007 to independently locate their rooms as seen through the generalization data. It is possible FCV#004’s barriers mentioned above account for the absence of increased wayfinding ability.

The severity of dementia may be related to lack of treatment effects. Participants’ MMSE scores ranged from 1 to 21. This is suspected because FCV#005 is the only participant that demonstrated some generalization and this participant had a MMSE score of 21 and the other two participants had MMSE scores of 4 and 1. However, it should be noted that existing literature shows that Spaced Retrieval is a viable intervention technique for individuals regardless of the severity of their cognitive deficits.
Limitations and Future Research

Limitations of the study consisted of factors that affected staff and participant participation throughout the course of the study. Staff experienced difficulty maintaining data collection guidelines set out at the beginning of the study. Although the staff collected initial baseline data, it was inconsistent and its reliability was questionable. Prior to the generalization data collection period the facility instituted regulations which limited accessibility of the data collection sheets as well as reminders to document. The purpose of the regulations was to ensure resident privacy. The restrictions that the regulations created contributed to an absence of staff collected generalization data at the end of the study.

The ability to provide consistent and frequent training to participants was another limitation of the study. The variable schedules of the graduate student investigators resulted in days in which a training session could not be accommodated. Training was not able to be conducted on Tuesdays and Wednesdays throughout the study which created a 48 hour lapse in consistent practice of the training response for each participant. Additionally, there were occurrences when the investigators were not able to be in the facility on planned training days (it should be noted that this was a limited occurrence). The participants’ alertness, agitation level, availability and participation consent also contributed to the variability in training frequency. These variables created gaps between SR training sessions and are likely to have created a disadvantage for the participants in mastering their SR goal.
It is recommended that future research consider modifications to the protocol to address variability in participant availability, consistent implementation of training sessions, and facility policy and procedure for tracking data. Availability of participants was dependent on their physical presence in the facility or time occupation with visitors, alertness, and agitation which had an impact on consistency of training. Medication disbursement by nursing staff to control agitation levels also impacted participant training ability for up to 24 hours post medication. Future research should account for these variables by allowing additional time for training sessions. Suggestions for accomplishing this include scheduling two time periods per day for training and data collection (i.e. morning and evening) or extending the interval of time each investigator spends training and collecting data (i.e. a three hour period instead of a two hour period). Additionally, access to documentation of medication disbursement occurrences for agitation management would allow the investigators to adjust the scheduled training sessions accordingly. The investigators on this project had limited time availability which led to gaps in training sessions of a day or more. A more frequent and consistent training schedule would have been beneficial to the memory impaired participants. Future research should also account for the nursing facilities policy regarding visibility of research related information. Participant confidentiality is of upmost importance when working with human subjects. The nursing facility must also uphold resident rights and confidentiality. It is suggested that investigators allow for time to survey staff individually during each visit to improve consistency of staff feedback for baseline and maintenance data collection.
CONCLUSIONS

In summary, the evidence from this study is inconclusive that SR training can benefit a person with dementia who demonstrates wayfinding difficulty in a long-term care facility setting. Goal mastery for this study was absent with little objective evidence for generalization. However, nursing staff provided anecdotal reports that participants experienced increased independence with wayfinding and decreased reliance on care giving staff. It is suspected that the abundant limitations that existed explained a great deal of the absence of mastery among the participants. Future research is needed to take into account variables such as participant availability and to find more efficient and reliable method to collect objective report from long-term care facility staff.
REFERENCES


APPENDIX A: CONSENT FORM
The Ohio State University Consent to Participate in Research

Study Title: Spaced Retrieval Training to Assist in Way finding for Long Term Care Residents With Dementia

Researcher: Michelle S. Bourgeois, Ph.D.

Sponsor: The Ohio State University

- **This is a consent form for research participation.** It contains important information about this study and what to expect if you decide to participate. Please consider the information carefully. Feel free to discuss the study with your friends and family and to ask questions before making your decision whether or not to participate.

- **Your participation is voluntary.** You may refuse to participate in this study. If you decide to take part in the study, you may leave the study at any time. No matter what decision you make, there will be no penalty to you and you will not lose any of your usual benefits. Your decision will not affect your future relationship with The Ohio State University. If you are a student or employee at Ohio State, your decision will not affect your grades or employment status.

- **You may or may not benefit as a result of participating in this study.** Also, as explained below, your participation may or may not result in increased way finding ability.

- **You will be provided with any new information that develops during the study that may affect your decision whether or not to continue to participate.** If you decide to participate, you will be asked to sign this form and will receive a copy of the form. You are being asked to consider participating in this study for the reasons explained below.

1. **Why is this study being done?**

   You are being asked to participate in a research project conducted by the OSU Speech-Language-Hearing department, in conjunction with staff of First Community Village. The purpose is to determine if Spaced Retrieval training in the use of external memory aids would increase successful way finding for people with dementia in a long-term care setting.

   In this study we wish to determine:

   1. Will Spaced Retrieval therapy be effective for teaching individuals with dementia to find their room?

   2. Will Spaced Retrieval therapy + external memory aid training be effective for training individuals with dementia to find their room?
Your participation in the project would involve:

1. Receiving either Spaced Retrieval training alone or Spaced Retrieval + external memory aid training to increase your ability to find your room.
2. Allowing a researcher to ask you some questions about your memory and to collect basic demographic information about you (age, gender, ethnicity and race, town and state of residence, cognitive status, diagnoses, town and state of residence, presenting problem(s), co-morbid conditions, and medications currently being taken).
3. Allowing the researcher to document basic information about therapy sessions (number of sessions, length of sessions, reasons for cancellation of sessions or termination, etc.) and report this information to Dr. Michelle Bourgeois at the OSU Speech and Hearing department.

2. How many people will take part in this study?
Up to 6 residents may be participating in this study at a given time.

3. What will happen if I take part in this study?
1. First the researcher will administer the Spaced Retrieval Screen (Brush & Camp, 1998) to tell if the SR technique will work with you. This involves the researcher asking you to remember a fact for 1 min; the researcher will tell you the fact and ask you to say it three times at 10 seconds, 30 seconds, and 1 minute.
2. Then the researcher will ask you where your room is and your room number, and practice having you repeat your room number using the SR technique. Each therapy session is expected to last no longer than 30 minutes. At the end of the session, the researcher will walk with you to your room. The Researcher will use an SR Data sheet and a tape recorder to record your responses.
3. Training will continue until you can find your room right away for three days in a row. Training will end at that point and the researcher will come back 1-week and 4-weeks later to ask you to find your room in order to see if you can remember for that length of time.

4. How long will I be in the study?
You will be in the study a minimum of 2 weeks and a maximum of 4 weeks.

5. Can I stop being in the study?
You may leave the study at any time. If you decide to stop participating in the study, there will be no penalty to you, and you will not lose any benefits to which you are otherwise entitled. Your decision will not affect your future relationship with The Ohio State University.
6. What risks, side effects or discomforts can I expect from being in the study?
   The risks of being in the study are minimal. Some people are embarrassed and frustrated by their memory problems and others get tired during therapy. If either of these things happen and you want to stop the training, just say so, and the researcher will stop the session. There is a very small chance that people who are not involved in the study might see your data, but the researchers will be especially careful to keep your data locked in cabinets in the speech & hearing department at OSU to avoid that from happening. In addition, all data will be de-identified which means it will not have your name on it, just a number.

7. What benefits can I expect from being in the study?
   It is anticipated that you will learn to find your room easily and consistently with this training and that this success will improve your quality of life.
   Additional potential benefits of the proposed research include broadening the knowledge of therapy techniques that will work with persons with dementia to increase way finding in long-term care settings.

8. What other choices do I have if I do not take part in the study?
   You may choose not to participate in this study, and you will be offered other types of training strategies without penalty or loss of benefits to which you are otherwise entitled.

9. Will my study-related information be kept confidential?
   Yes, every effort will be made to keep your study-related information confidential. However, there may be circumstances where this information must be released. For example, personal information regarding your participation in this study may be disclosed if required by state law.
   Also, your records may be reviewed by the following groups (as applicable to the research):
   - Office for Human Research Protections or other federal, state, or international regulatory agencies;
   - U.S. Food and Drug Administration;
   - The Ohio State University Institutional Review Board or Office of Responsible Research Practices;
   - The sponsor supporting the study, their agents or study monitors.

You may also be asked to sign a separate Health Insurance Portability and Accountability Act (HIPAA) research authorization form if the study involves the use of your protected health information.
109 10. What are the costs of taking part in this study?
110 There are no financial costs to participate in this study.
111
112 11. Will I be paid for taking part in this study?
113 No, participants will not receive compensation for participating in this study.
114
115 12. What are the risks to participating in this study?
116 The only minimal risk to participating in this study is loss of confidentiality. To protect
117 confidentiality, all data will be identified by identification numbers only. Data will be stored
118 in locked areas in the OSU Speech & Hearing department. To protect your identity, this data
119 will be destroyed or erased from any storage devices after the scientific usefulness of the
120 information collected is over.
121
122 13. What are my rights if I take part in this study?
123 If you choose to participate in the study, you may discontinue participation at any time
124 without penalty or loss of benefits. By signing this form, you do not give up any personal
125 legal rights you may have as a participant in this study.
126 You will be provided with any new information that develops during the course of the
127 research that may affect your decision whether or not to continue participation in the study.
128 You may refuse to participate in this study without penalty or loss of benefits to which you
129 are otherwise entitled.
130 An Institutional Review Board responsible for human subject's research at The Ohio State
131 University reviewed this research project and found it to be acceptable, according to
132 applicable state and federal regulations and University policies designed to protect the rights
133 and welfare of participants in research.
134
135 14. Who can answer my questions about the study?
136 For questions, concerns, or complaints about the study you may contact Michelle S.
137 Bourgeois, PhD, Principal Investigator at (614) 292-1742.
138
139 For questions about your rights as a participant in this study or to discuss other study-related
140 concerns or complaints with someone who is not part of the research team, you may contact
141 Fran Welsh, ADC, Life Enrichment Director at First Community Village, 614-486-9511 or
142 Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.
Signing the consent form

I have read (or someone has read to me) this form and I am aware that I am being asked to participate in a research study. I have had the opportunity to ask questions and have had them answered to my satisfaction. I voluntarily agree to participate in this study.

I am not giving up any legal rights by signing this form. I will be given a copy of this form.

Printed name of subject

Signature of subject

Date and time

Printed name of person authorized to consent for subject (when applicable)

Signature of person authorized to consent for subject (when applicable)

Date and time

Relationship to the subject

Investigator/Research Staff

I have explained the research to the participant or his/her representative before requesting the signature(s) above. There are no blanks in this document. A copy of this form has been given to the participant or his/her representative.

Printed name of person obtaining consent

Signature of person obtaining consent

Date and time
APPENDIX B: HIPPAA AUTHORIZATION FORM
THE OHIO STATE UNIVERSITY
AUTHORIZATION TO USE
PERSONAL HEALTH INFORMATION IN RESEARCH

Title of the Study:
Spaced Retrieval Training to Assist in Wayfinding for Long Term Care Residents With Dementia

OSU Protocol Number: 2012B0047

Principal Investigator: Michelle Bourgeois, Ph.D.

Subject Name ____________________________

Before researchers use or share any health information about you as part of this study, The Ohio State University is required to obtain your authorization. This helps explain to you how this information will be used or shared with others involved in the study.

- The Ohio State University and its hospitals, clinics, health-care providers and researchers are required to protect the privacy of your health information.
- You should have received a Notice of Privacy Practices when you received health care services here. If not, let us know and a copy will be given to you. Please carefully review this information. Ask if you have any questions or do not understand any parts of this notice.
- If you agree to take part in this study your health information will be used and shared with others involved in this study. Also, any new health information about you that comes from tests or other parts of this study will be shared with those involved in this study.
- Health information about you that will be used or shared with others involved in this study may include your research record and any health care records at the Ohio State University. For example, this may include your medical records, x-ray or laboratory results. Psychotherapy notes in your health records (if any) will not, however, be shared or used. Use of these notes requires a separate, signed authorization.

Please read the information carefully before signing this form. Please ask if you have any questions about this authorization, the University’s Notice of Privacy Practices or the study before signing this form.

Initials/Date: _______________________ 09/25/09

Page 1 of 3
Those Who May Use, Share And Receive Your Information As Part Of This Study

- Researchers and staff at The Ohio State University will use, share and receive your personal health information for this research study. Authorized Ohio State University staff not involved in the study may be aware that you are participating in a research study and have access to your information. If this study is related to your medical care, your study-related information may be placed in your permanent hospital, clinic or physician’s office records.

- Those who oversee the study will have access to your information, including:
  - Members and staff of the Ohio State University’s Institutional Review Boards, including the Western Institutional Review Board
  - The Office for Responsible Research Practices
  - University data safety monitoring committees
  - The Ohio State University Research Foundation

- Your health information may also be shared with federal and state agencies that have oversight of the study or to whom access is required under the law. These may include:
  - The Food and Drug Administration
  - The Office for Human Research Protections
  - The National Institutes of Health
  - The Ohio Department of Human Services

These researchers, companies and/or organization(s) outside of The Ohio State University may also use, share and receive your health information in connection with this study: None

Authorization Period

This authorization will not expire unless you change your mind and revoke it in writing. There is no set date at which your information will be destroyed or no longer used. This is because the information used and created during the study may be analyzed for many years, and it is not possible to know when this will be complete.

Signing the Authorization

- You have the right to refuse to sign this authorization. Your health care outside of the study, payment for your health care, and your health care benefits will not be affected if you choose not to sign this form.

- You will not be able to take part in this study and will not receive any study treatments if you do not sign this form.

Initials/Date

Page 2 of 3

09/25/09
• If you sign this authorization, you may change your mind at any time. Researchers may continue to use information collected up until the time that you formally changed your mind. If you change your mind, your authorization must be revoked in writing. To revoke your authorization, please write to:

   Michelle Bourgeois, Ph.D., Principal Investigator, The Ohio State University, Dept. of Speech & Hearing Science, 1070 Carmack Road, Columbus, OH 43210

• Signing this authorization also means that you will not be able to see or copy your study-related information until the study is completed. This includes any portion of your medical records that describes study treatment.

Contacts for Questions

• If you have any questions relating to your privacy rights, please contact:

   Gail Whitelaw, Clinic Director, OSU Speech-Language-Hearing Clinic, 110 Pressey,
   1070 Carmack Road, Columbus, OH 43210, 292-6251

• If you have any questions relating to the research, please contact:

   Michelle Bourgeois, Ph.D., Principal Investigator, The Ohio State University, Dept. of Speech & Hearing Science, 1070 Carmack Road, Columbus, OH 43210

Signature

I have read (or someone has read to me) this form and have been able to ask questions. All of my questions about this form have been answered to my satisfaction. By signing below, I permit Michelle Bourgeois, PhD, CCC-SLP and the others listed on this form to use and share my personal health information for this study. I will be given a copy of this signed form.

Signature
   (Subject or Legally Authorized Representative)

Name
   (Print name above)
   (If legal representative, also print relationship to subject.)

Date       Time            AM / PM

Page 3 of 3

09/25/09
APPENDIX C: SPACED RETRIEVAL PROTOCOL
Training Wayfinding Skills Using Spaced Retrieval for People with Dementia

**Spaced Retrieval Training Protocol** (Data Collection forms and Instruments)

**Demographic Information**

Date: _______________  Investigator Initials: ____________

Participant Initials: ____________  Subject #: ____________
(Last, First)
Address: __________________________________________

Caregiver Initials: ____________  Relationship: ______________
Caregiver Address: ______________________________________
Caregiver Phone: ____________________________

Participant Information:

Date of Birth: (MM/DD/YYYY): __/_/____  Age: ______________

Diagnoses: ____________________________________________
____________________________________________________

Race: (1) American Indian and Alaska Native alone
(2) Asian alone
(3) Black or African-American alone
(4) Native Hawaiian and Other Pacific Islander alone
(5) Some other race alone (specify) ______________________
(6) White alone
(7) Two or more Races (specify) _________________________

Gender: (1) Female
(2) Male

Education Level (highest level completed):

Primary Language:
(1) English
(2) Other (specify) ____________________________
Screening Measures

A. Functional vision, hearing, and communication screening measures (Bourgeois et al., 2001)

VISION (from Minimal Data Set 2.0)
(Ability to see in adequate light and with glasses if used)
0. ADEQUATE – sees fine detail, including regular print in newspapers/books.
1. IMPAIRED – sees large print, but not regular print in newspapers/books.
2. MODERATELY IMPAIRED – limited vision; not able to see newspaper headlines, but can identify objects.
3. HIGHLY IMPAIRED – object identification in question, but eyes appear to follow objects.
4. SEVERELY IMPAIRED – no vision or sees only light, colors, or shapes; eyes do not appear to follow objects.

VISUAL LIMITATION/DIFFicultIES
a. Side vision problems – decreased peripheral vision (e.g., leaves food on side of tray, difficulty traveling, bumps into people and objects, misjudges placement of chair when seating self).
b. Experiences any of following: sees halos or rings around lights; sees flashes of light; sees curtain over eyes.
c. NONE OF ABOVE

VISUAL APPLIANCES
Glasses; contact lenses; magnifying glass
0. No 1. Yes

HEARING
(With hearing appliance, if used)
0. Hears adequately – normal talk, TV, phone
1. Minimal difficulty – when not in quiet setting
2. Hears in special situations only – speaker has to adjust tonal quality and speak distinctly
3. Highly impaired – absence of useful hearing
COMMUNICATION DEVICES/TECHNIQUES

(Check all that apply during last 7 days)

a. Hearing aid present and used
b. Hearing aid, present and not used regularly
c. Other receptive communication techniques used (e.g., lip reading)
d. None of the above

COMMUNICATION

5 MINUTE CONVERSATION

Set stopwatch for 5 minutes. Prompt at 3.5 and 2.0 minutes approximately. If necessary, use other general prompts (“tell me more” or “what else can you tell me about your life, family, etc.”).

1. Tell me about your family.
2. Tell me about your life.
3. Tell me about your day.

Rating of Responses

1. No verbal or vocal response to interviewer.
2. Unintelligible verbal responses, or vocalizing only.
3. Single word responses, includes yes/no responses.
4. Phrases, multi-word only.
5. Single sentences only.
6. Elaborated conversation; multiple sentence responses; appropriate, normal conversation.
B. MINI – MENTAL STATE EXAMINATION (Folstein, Folstein, & McHugh, 1975)

1. Please tell me today’s date.
   1.1 What month is it? __________
   1.2 What date is it? __________
   1.3 What year is it? __________
   1.4 What day is it? __________
   1.5 What season is it? __________

   1.6 Score (Maximum score = 5)

2. Please tell me where we are in right now?

   2.1 building __________
   2.2 floor __________
   2.3 city __________
   2.4 county __________
   2.5 state __________

   2.6 Score (Maximum score = 5)

3. I’m going to name three objects and I’d like you to repeat them after me. (Name three objects, allowing one second to say each one.)
   Apple . . . Table . . . Penny

Give 1 point for each correct answer on the first trial only. Repeat the objects until the patient can name them all (maximum of 6 trials). Stop after 6 unsuccessful trials and enter a 7 for number of trials to indicate that they never learned the succession.

   3.1 # of Trials __________

   3.2 Score (Maximum = 3) __________
4. Use one score. Record the highest score between 4.1 and 4.2

4.1 I'm going to ask you to do some subtraction. Think of the number 7. I want you to subtract 7 from 100. Now subtract 7 from that number and keep going until I stop you.

(Enter numbers given by respondent below)

4.1.1 _______ (93)
4.1.2 _______ (86)
4.1.3 _______ (79)
4.1.4 _______ (72)
4.1.5 _______ (Stop) (65)

4.1.6 Score (Maximum Score = 5)

4.2 I want you to spell a word forward and then backward. The word is ‘WORLD’.

4.2.1 Spell it forward. _______ _______ _______

(Write exact letters given by respondent in blanks.)

(If incorrect, stop and record zero for score)

4.2.2 Spell it backward. _______ _______ _______

(Write exact letters given by respondent in blanks.)

4.2.3 Score (Maximum Score = 5)

5. Do you remember a few minutes ago, I had you repeat some words after me? Tell me what they were? (Give 1 point for each correct answer.)

5.1 _______ _______ _______

Score (Maximum Score = 3)
6. Please name these for me.

(Show the client a wooden pencil and a watch, preferably worn on the wrist.
Score 1 point for each correct answer.)

6.1 ____________________ (pencil)
6.2 ____________________ (watch)

6.3 Score (Maximum Score = 2)

7. I’m going to read a sentence and I want you to repeat it after me. Say exactly what I say.
(Score 1 point only if every word repeated correctly.)

NO IFS, ANDS, OR BUTS. ____________________

7.1 Score/Maximum score = 1

8. Read this card and do what the card tells you to do.

(Show the card with “Close your eyes” on it. One prompt allowed after initial instructions.)
(Score 1 point. You may need to tell them to open their eyes.)

8.1 Score (Maximum score = 1)

9. Now I’m going to ask you to do something for me. I’m only going to say it once, so listen carefully. (Score 1 point for each step.)

Take this paper in your right hand; __________
Fold the paper in half with both hands; __________
And put the paper in your lap. __________

9.1 Score (Maximum score = 3)
10. **Now, please write a sentence for me on the piece of paper.**

(Do not dictate a sentence or provide a subject; it must be written spontaneously.
The sentence must contain a subject and verb and be sensible. Correct grammar
and punctuation not necessary. Score 1 point.)

10.1 Score (Maximum = 1 )

11. **Please copy this design exactly as it is for me.**

(Hold the card with the design on it in front of the client; do not let the client trace the design.
All 10 angles must be present, and 2 must intersect to score 1 point.
Tremor and rotation are ignored.)

11.1 Score (Maximum = 1 )

12. **Did the client exhibit any signs of illiteracy, or of physical impairments that would hinder performance on any of the items in this test?**

(Do not include this score in the MMSE total score.)

( ) No

( ) Yes

If yes, please specify:

__________________________

MMSE TOTAL SCORE (Maximum = 30) ______
C. Spaced Retrieval Screen (Brush & Camp, 1998)

1. *(NO DELAY)*  “Today we are going to practice remembering my name. My name is_________. What is my name?”
   
   Correct: “That’s right. I am glad that you remembered.”

2. *(SHORT DELAY)*  “Good. I will give you more opportunities to practice as I am working with you today.
   
   Let’s try again. What is my name?”
   
   Correct: “That’s right. I am glad that you remembered.

3. *(LONG DELAY)*  “You are doing well remembering my name for a longer period of time, and that’s the idea. I would like you to always remember my name. I will be practicing this with you during therapy by asking you often. What is my name?”
   
   Correct: “That’s right you are remembering for a longer period of time. You did a great job remembering my name.”

If the client is incorrect at any level 3 times in a row, this client is not appropriate for SR training, say: “Thanks for trying so hard. Let’s work on something else now.”

---

D. Sample Data Sheet for Wayfinding Behaviors (pre- and post-training)

<table>
<thead>
<tr>
<th>Date</th>
<th>Wayfinding Attempt Initiated by Resident</th>
<th>Wayfinding Attempt Initiated by Staff/Researcher</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Successful within 3 Min.</td>
<td>Unsuccessful within 3 Min.</td>
</tr>
</tbody>
</table>
APPENDIX D: NURSING STAFF DATA COLLECTION FORM
<table>
<thead>
<tr>
<th></th>
<th>Monday date</th>
<th>Tuesday date</th>
<th>Wednesday date</th>
<th>Thursday date</th>
<th>Friday date</th>
<th>Saturday date</th>
<th>Sunday date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resident</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>2:30-10:30</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
</tr>
</tbody>
</table>

**Directions:** Please make a tally mark in the appropriate box when a resident is seeking their room. Place a tally in the **YES** column when the resident is able to successfully find their room without assistance within 3 minutes. Place a tally in the **NO** column when the resident is unable to find their room without assistance within 3 minutes. Thank you for your assistance.
APPENDIX E: SAMPLE SPACED RETRIEVAL DATA COLLECTION FORM
### E. SPACED RETRIEVAL DATA SHEET

**Client ID#**

**Date:** ________ **Session #:** ________

**Goal Prompt:** ___________________________________________________________

**Response:** ____________________________________________________________

**Executed Strategy:** _______________________________________________________________________

**Goal Modification:** _______________________________________________________________________

**Previous longest interval:** __________

<table>
<thead>
<tr>
<th></th>
<th>Trial 1</th>
<th>Trial 2</th>
<th>Trial 3</th>
<th>Trial 4</th>
<th>Trial 5</th>
<th>Trial 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>sec/min</td>
<td>______</td>
<td>______</td>
<td>______</td>
<td>______</td>
<td>______</td>
<td>______</td>
</tr>
<tr>
<td>+ / -</td>
<td>______</td>
<td>______</td>
<td>______</td>
<td>______</td>
<td>______</td>
<td>______</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Trial 7</th>
<th>Trial 8</th>
<th>Trial 9</th>
<th>Trial 10</th>
<th>Trial 11</th>
<th>Trial 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>sec/min</td>
<td>______</td>
<td>______</td>
<td>______</td>
<td>______</td>
<td>______</td>
<td>______</td>
</tr>
<tr>
<td>+ / -</td>
<td>______</td>
<td>______</td>
<td>______</td>
<td>______</td>
<td>______</td>
<td>______</td>
</tr>
</tbody>
</table>

**Observations:** ____________________________________________________________

__________________________________________________________________________

__________________________________________________________________________