Roses Grow in a Butterfly Garden

Stories and Cognitive Activities for Elder Life and How They Work

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A Report about Current Research: Maintenance of Cognitive Skills in Persons with Alzheimer-type Dementia[1]

by

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Introduction and Rationale

A long-standing dilemma in dementia care is to develop *interesting* activities *with cognitive benefits* for persons with Alzheimer's disease. To provide age-appropriate, *grown-up* tasks that give fitting support for each person in a group is a tremendous challenge for caregivers and activity directors. There has been a gap between cognitively supportive eldercare practice and the research to guide that cognitive support. We aimed to identify key studies in developmental and cognitive psychology that could inform our approach to activities—by supporting learning, thinking, and memory in eldercare and dementia care. Sound research in psychology is the platform for our program of activity development.

Vygotsky (1926/1997) is well known for his research on child development. He was not a gerontologist, but his concept of scaffolding can be loosely applied to cognitive support activities for adults, including persons with Alzheimer-type dementia. According to Vygotsky, scaffolding occurs when the environment supports thinking, and this idea is what we have borrowed when we talk about scaffolding memory in Alzheimer's disease.

We have also drawn from research in cognitive psychology, such as work on benefits of practice and repeated testing (e.g., Ebbinghaus, 1885/1964; Rabbitt, Diggle, Smith, Holland, & McInnes, 2001). In addition, there is evidence that collaboration during remembering can boost a person's performance (e.g., Ross, Spencer, Blatz, & Restorick, 2008). In sections that follow, we will more fully explain ways in which those results are pertinent to activities that we have developed.

Deriving our ideas for testable activities from principles in developmental and cognitive psychology, we have designed studies that assess memory cueing, practice, and repeated testing. Our activities also use the presence of others to support memory through collaborative processes. Our techniques for memory cueing are described in detail, below, as are the ways in which we build collaborations during an activity session. *Practice* and *repeated testing occur together* and are aptly called "retrieval practice" (after Rohrer & Pashler, 2007). In retrieval practice, a participant is called upon to remember information and/or skills within the context of performance in an activity (e.g., building a collage with step-by-step skills that are practiced weekly; participating in a weekly trivia game by reading clues on index cards; taking part in a weekly "scavenger hunt" by finding pictures in magazines/catalogs).

With respect to memory cues, we reported benefits to memory performance when cognitive tasks for persons with probable Alzheimer's disease included structured cueing (e.g., Seifert, 1998; Seifert & Baker, 1998). To remark about our terminology, "cue" and "probe" are terms in memory research that are generally used as synonyms. **Memory cues and probes are any aspects of a person, an object, or the environment that might trigger a memory.** With respect to the word "prompt", this can refer to cueing a specific sense modality, and we usually use the word to refer to "verbal cues" (like *asking* a person whether s/he can think of a type of four-legged animal). Thus, the former terms are more general, and the latter label can be more specific (referring to a cue given verbally).

Returning to the idea of memory cues in group activities: Sometimes, it helps to present memory prompts in order from the "least supportive" to the "most supportive" (see Parts I and II of this volume—especially the 5 Big Hints, where memory support increases as hints are given; Seifert, 2007; Seifert & Baker, 1998). Our scaffolding approach can give participants opportunities to demonstrate their memory skills with relatively little support—or, later in the task—with more support.

Beyond scaffolding a participant's performance with individual prompts (such as, "[Person's name], do you have a picture of a dog among your cards?"), we use the presence of a group to further support memory *through collaboration.* We start activities with probes that are oriented toward the group, but to which any person might respond. In some tasks, we use repetition of probes in order to support attention to them by persons with Alzheimer's disease (as in Prompt #2; Figures 1 and 2 at this chapter's end). A later step in this scaffolding is to address an individual directly and ask him/her a question, which has already been addressed to the entire group (as in Prompts #3 and #4 in Figure 1 and Prompts #3, #4, and #5 in Figure 2). A much later step in the scaffolding sequence is to provide open opportunities for group interaction and reflection. These chances generally come at the end of a round in the game, or at the close of the activity session, and they include general discussion about the topic.

Research on memory indicates that interactions with others can facilitate correct responses and reduce incorrect ones (Ross, Spencer, Blatz, & Restorick, 2008). Our tasks provide opportunities for eventual collaboration. Scaffolding can start with cues announced to the entire group, but without group discussion (with individuals "playing their own cards" at that point). Then, scaffolding continues with repetition of cues for the individual (with cueing directed at persons who have not responded or who appear to be having difficulty with the task). After that, scaffolding continues with a return to group-oriented cues for more general, open discussion. At the final stage, the entire group can take part in a conversation about the item or task. This can foster better performance and improve interest by drawing low-functioning participants into the task. This approach can lead a lower-functioning participant to success in responding through repetition of cues, through better focus on cues through direct questioning, and, finally, *through conversation with other group members.*

In an explanation of three activities that follows, we have given lists of probes (i.e., questions; see Figures 1 and 2 at this chapter’s end) that can be used to provide support for memory. The probe lists and corresponding activities also lend themselves to additions: i.e., collaborative memory support following probes for individual performance. It's easy for a group leader to add probes after those we've given here (as in Figures 1 and 2). An added cue, such as, "Have you been to the Eiffel Tower?" can be asked of the *entire group*, thereby leading to group discussion and collaborative reflection. This might have a general benefit to long-term memory (Ross et al., 2008).

Structured cues for memory. In order to cue memory systematically, we have developed an approach that is "cognitive-social interactionist." We utilize memory cues, practice, repeated testing, and opportunities for collaboration to bolster memory performance among persons with Alzheimer's disease. As mentioned above, we use a sequence of memory probes to scaffold remembering. The activity environment is structured to support memory. Activity materials (like pictures, music, foods, and decorations) are selected to scaffold remembering.

It is important to remark that a system of multi-cueing need not create a "noisy" or chaotic environment that differentially undermines attentional processes of the person with Alzheimer's disease (about distraction and AD, see Parasuraman & Greenwood, 1998). And such a system can be devised within a person-centered orientation: that is, from an informed position regarding the specific individuals who might take part in the activity (see Kitwood, 1993, 1997; about the 'culture of care', see Leininger & McFarland, 2006). Preparation and knowledge about participants are key for caregivers, staff, and volunteers who organize and administer activities for elders. **Overall, we believe that activity directors and their staff are critically important to improving the functionality of the environment as a cueing context for persons with AD. They do this by pre-planning the arrangement of a room, the various environmental cues that will be available, the steps that will be followed in the activity, and the persons who are good candidates to take part in that activity.**

Previously, Camp and his colleagues (e.g., Camp & McKitrick, 1992) reported the benefits of building tiers of cognitive, behavioral support into Montessori tasks for persons with dementia. Camp tested Montessori activities and showed advantages of their use in eldercare: with benefits typically reported as participant engagement (see Camp, 2001, p. 507). Our activities are not considered "Montessori", because they are not true to Maria Montessori's goal of achieving complete independence in the learner (Montessori, 1964; Standing, 1970). However, we do measure performance on our tasks over time, and we strive to find activities that foster maintenance—or even improvement—with practice. Our goal is to help support memory during decline from AD and related diseases. As mentioned previously, our chief aims include effectively cueing functional behaviors, in order to scaffold an individual to a higher plane of performance than s/he could accomplish alone (Vygotsky, 1926/1997).

Practice and repeated testing. A basic, robust finding of memory research is the general benefit of practice through repetition (Ebbingaus, 1885/1964). Beyond simple repetition, research indicates that *repeating procedures, rather than facts*, might be more beneficial for maintaining functional status among individuals with Alzheimer's disease, because procedural memories are more resistant to decline from the disease than are declarative memories (Knopman & Nissen, 1987; Poe & Seifert, 1997).[2] When they repeated the AH4 (1), which is a test of cognitive skills for adults, Rabbitt, et al. (2001) reported greater advantages from practice for elders—*thereby suggesting the relative importance of repetition for maintaining performance in older adults (i.e., compared to younger adults). Practicing a specific cognitive activity might benefit elders more than it benefits younger adults.* As mentioned in Chapter 5 of this book, there is renewed research interest in the benefits of repeated testing on memory, and it has led to early promising results by those who have carefully controlled the experimental environment of repeated tests (e.g., Ross, Spencer, Blatz, & Restorick, 2008; Roediger & Karpicke, 2006).

A primary goal of our collaborative research over the past thirteen years has been to help elders in long-term care maintain their functional status—even if they are suffering some decline due to probable Alzheimer's disease (Seifert, 2007). **Practice is an**

important part of all the activities described here. Generally, we utilize weekly practice of a given activity.

As was previously stated, there is renewed interest in the effects of repeated testing on memory (e.g., Roediger & Karpicke, 2006). **The "practice" in the activities we have tested since 1996 embodies repeated testing. Every chance to practice includes an opportunity for the participant to demonstrate his/her skill and/or knowledge (e.g., looking at pictures and pointing to the one that is an example of a word that the researcher or group leader has just said; as in the three activities, below). Moreover, as scaffolding increases in one of our tasks, we also provide an opportunity for collaboration in memory performance by conversing with participants about the tested item (for more about collaborative memory, see Ross et al., 2008). As mentioned above, a natural offshoot of testing memory in a group activity, is that the researcher/group leader can open the door for collaborative memory by prompting discussion about a stimulus, before moving on to test the next item. Collaborative aspects of the task can also increase participants' enjoyment of them.**

The types of practice we use are active and they resemble testing, because each participant is a "player" in the activity and is responsible for handling his/her own pictures, stimuli, or game cards. Our tasks resemble tests, because they provide ways to evaluate performance (see Figures 1 and 2), and this makes them very useful tools for caregivers and for others who must track a person's level of functioning. However, the tasks, do not, resemble "testing" in terms of social demand. The atmosphere is generally relaxed and participants can choose not to respond. The researcher or group leader does not pressure participants. If they do not or cannot respond, then the leader doesn't demand an answer or response. **If the reader is thinking about adapting the following activities for one of his/her groups, then s/he can read the following and think of the "researcher" as an activity director or staff member.**

Method

Participants. Individuals in the three studies reported here were residents at three long-term care facilities in northeastern Ohio. Overall, twenty-nine elders (3 males), aged 70 to 97 years, were part of ongoing activities for cognitive support at these facilities. Residents at all three facilities took part in enrichment programs which included assorted activities with numerous practice sessions across several months. Enrichment programs involved many activities, including our twice-weekly sessions. The programs were designed to improve quality-of-life and maintain cognitive function while providing opportunities for maintenance rehearsal (of fact-based knowledge) and repetition of procedures (i.e., generally, practicing once per week on a specific game or task).

Across the three tasks reported here, sample sizes varied as a function of the relative availability of participants across tasks and sessions. Individuals were persons with diagnoses of probable or possible Alzheimer's disease (via a licensed physician). The range of initial cognitive scores (i.e., represented by the Mini-Mental State Exam, or "MMSE"; Folstein, Folstein, & McHugh, 1975) was 5 – 21, with means reported below for individual studies. Factors affecting one's presence at a specific session included, but are not limited to: facility scheduling of events, individual health, and personal preferences to take part.

Materials and General Procedures. One of us (Seifert, 2007, pp. 83-117) described some techniques for utilizing picture and text-based cues on index cards. Additional tasks with index cards are described in the current book (Chapter 4). In the tasks reported below, one study (Card Pick-Up: "CPU") included Seifert's (2007) method for using index cards to cue recognition. In this technique, each participant received 4 index cards (5 in X 8 in): each card with high quality images (via stickers) affixed to it. The number of objects on each card was varied randomly (from 1 to 6) so as ***to prevent*** *participants from using unique numbers* to identify objects (e.g., to prevent object-number associations like: "The dog card always has five on it"). A second study (called World Landmarks: "WLM") made use of high quality images of natural and constructed landmarks (e.g., Mt. Rushmore, the Eiffel Tower) in a recognition activity. A third task ("MTH") utilized magazines and typical, magazine-formatted catalogs that arrive by US mail each week. These advertise a plethora of products for daily activities from housecleaning, to apparel, to cooking, and beyond. All pictures of objects were photos or high quality color-pencil drawings, and participants were asked to find examples of common people/objects (e.g., a man, a child, a shoe).

Procedures for all three tasks were similar: set within the context of activities for individuals with dementia in long-term, residential care. Individuals were approached by one of the researchers and asked whether they wished to take part in an after-supper activity (generally, from 6:00 PM – 8:00 PM; twice per week). At one of the three facilities, the sessions were usually run before supper (e.g., 3:00 PM – 5:00 PM). Those who agreed to participate were directed to a large activity room or commons area at their facility. Participants were assisted to take positions/seats around a large table (approximately 12 ft X 6 ft; or 15 ft X 8 ft, when additional space was added for more participants). Seats and wheelchairs were situated so that an individual had approximately 2-3 square feet of his/her own table space. This helped to alleviate possibilities of one person "playing" another person's game cards or using someone else's materials.

In general, activities were designed to resemble commonly known games, like bingo and "go-fish" (a card game). The tasks were played in "rounds", with an evening's session including from 1 to 5 rounds of a single game (usually 3 rounds, depending upon the time allotted by the facility). As mentioned previously, "scaffolding" was built into activities, with a round beginning with distribution of materials to each participant. Figures 1 and 2 (at the end of this chapter) show the prompts given to participants during rounds of a given activity. The Figures also provide the scoring rubrics/rules. The leader would name a cue aloud—and loudly enough so that all participants could hear it. After that, the researcher would repeat the verbal cue while walking around the table to check on individuals' performance. Finally, the researcher would name the verbal cue again, while walking around the table and showing a picture of the item (thereby providing a visual cue, with an opportunity for activation of information in semantic memory via a non-verbal route; Seifert, 1997). If a participant did not appear to be attending to his/her stimuli, the researcher would address that person individually and by name with each cue (see Figures 1 and 2).

An individual's performance for a given activity at a session is reported as the average (MEAN) proportion correct across trials—with a "trial" being defined as one round of the game. The primary purpose of scoring is to track participants' performance over time. See Figures 1 and 2 for more details about scoring in the three activities described here. In a given session, one of the researchers was present, and she was usually aided by a student assistant, who could "call" verbal cues and show picture cues, while the researcher wrote down players' scores. In CPU and WLM, scoring was clandestine, and those games were not played competitively. In MTH (Task #3, below), however, the game can be played competitively, and if it is, a scoreboard is kept with players' names and cumulative scores, so that prizes can be awarded. In all three tasks, consent forms for participants' were signed by their guardians/POAs. Furthermore, a participant's assent was indicated when s/he agreed to take part in an activity session.

Task #1: Card Pick-Up [3]

Card Pick-Up (CPU) is a simple picture recognition task. The game is *very loosely* fashioned after picture bingo. Each individual receives a set of large index cards. Each of the 5 in X 8 in cards is white with picture(s) on it. Each picture is actually an index card with 1 to 6 stickers on it. Each sticker is about 1-inch-square. Basic-level concepts are represented: dogs, cats, flowers, butterflies, inch-worms.

The stickers in our CPU activity were chosen for their photo quality and recognizability (as assessed by undergraduate volunteers at Malone University, previously known as Malone College), with the exception of the inch-worms—which were the least realistic in their representation and the most cartoon-like. All stickers on a card were of different exemplars from the same basic-level category (beagle, poodle, and collie as examples of the category DOG). Each card had a different spatial arrangement, number of objects, and combination of subordinate exemplars on it (e.g., terrier, beagle, and dachshund on one card; poodle, collie, beagle, cocker spaniel, and pug on another card). There was no correspondence between number of stickers on a card, spatial arrangement of stickers on the card, and the basic-level concept that was represented on the card. Number and arrangement were random.

A trial or "round" in CPU began with the distribution of either 3 or 4 cards to each participant (as a function of card availability/group-size). The number of cards given to all participants *in a specific round* was the same. Participant *performance is reported as proportion-correct.* Thus, the complication of 3 versus 4 cards across rounds of a game is negligible. In general, across sessions and across rounds, the number of cards played was 4.

As the game began, the researcher checked to be sure that participants' cards were far enough apart on the common table to prevent one person from playing someone else's cards. Each player was seated at the table with cards displayed in front of her/him. As a round began, the researcher called, "I am looking for flowers. If you have a card with flowers on it, please, pass it in." The researcher would demonstrate (with a blank card) that a person should hold his/her card up for collection. It should be noted that flowers are used as an example here, and that, in actuality, the order of probes across rounds was random—with some rounds beginning with flowers, others with dogs, etc.

As the researcher walked around the table collecting cards (generally held up toward the standing researcher and away from participants), she would state, "I am looking for flowers. If you have a card with flowers on it, then please, hold it up for me to collect." If an individual looked puzzled or did not appear to be looking at his/her cards, the researcher would approach that person. Addressing him/her by name, the researcher would ask, "[NAME], do you have a card with a flower on it?" If the researcher received no response or a reaction of puzzlement, she would proceed to prompt again. Smiling, and then, pointing in the direction of the person's cards (but without pointing at a specific card), the researcher would ask, "[NAME], do you see any flowers here?"

As a final cue in the round, the researcher would hold up a card with flowers on it and walk around the table showing it to players, asking, "Do you have a card that matches? Do you have a card with these on it? They are flowers." The same procedure was used for rounds that cued dogs, cats, butterflies, inch-worms, and flowers.

As an aside to researchers: This last cue did not generally provide an opportunity for identity matching, because each card was unique. Thus, when the researcher held up a card with dogs and asked, "Do you have a card that matches? Do you have a card with these on it? They are dogs," a participant would still have to make the translation from the researcher's sample card to his/her own card with a different arrangement of dogs on it. [4]

For activity directors and caregivers who might adopt this activity (and the two that follow), it would be easy to prompt group discussion, collaborative reflection, and sharing by adding a question at the ends of selected rounds of the game, such as: "Do I have all the cards with dogs on them? I love dogs...My dog is a boxer. Are there any dog lovers in the group? [Name—indicating a specific person], have you ever had a dog?" This type of conversation starter can lead to highly collaborative group reflection.

Card Pick-Up results are reported as proportion-correct performance for 9 persons (8 females, 1 male) aged 70 – 97 (MEAN = 85.5, SD = 8.04; with three ages held back from us by the family/facility, but with assurances that they met our criterion: being at least 70 years, with late-onset type AD). MMSE's were administered to all participants within two months of the start of the study, with a range from 5 – 21 (MEAN = 12.67, SD = 5.51). Ending MMSE scores were available for seven participants, with a range from 0 – 19 (MEAN = 9.0, SD = 8.21). Data were collected over 14 months, and criteria for inclusion of a participant's results in our analyses were: (a) information that the participant was 70 years or older with a physician's diagnosis of possible or probable Alzheimer's disease, (b) documentation of an MMSE score at the study's start, and (c) documentation of performance data for ALL sessions (start, 3 months, 9 months, & 14 months). Table 1 lists CPU scores for individual participants.

for Table 1, please, go on to the next page…

Table 1
Card Pick-Up:
Proportion-correct Scores (Initial, 3 months, 9 months, 14 months)

Subject	MMSE Start – End	Starting Age**	Time 1	Time 2	Time 3	Time 4
1	10 – unknown	**	1.00	1.00	1.00	1.00
2	7.5– unknown	**	1.00	0.88	0.50	0.25
3	5 – 2	**	1.00	0.71	0.25	0.25
4(male)	12 – 0	79	0.92	0.88	1.00	0.25
5	21 – 19	83	1.00	0.92	1.00	1.00
6	18.5 – 17	75	1.00	1.00	1.00	0.00
7	17 – 14	90	1.00	1.00	1.00	1.00
8	15 – 11	97	1.00	0.75	0.96	1.00
9	8 – 0	89	0.50	0.83	0.96	0.17

**Age/DOB held back by family. Assurances given that participant was > 70 years.

CPU results revealed remarkable stability in performance (proportion correct), with $p > .05$ *for the within-subjects (ANOVA) comparisons across 3 sessions, over 9 months.* An individual's performance over time can indicate the effect of practice on performance. A decline in mean scores evidenced *only at the most distal test* (after 14 months of sessions), $F\ (1, 8) = 7.01$, $p < .03$, $MSE = .15$ (with the 14-month performance compared to the previous time's, i.e., at 9 months). Mean performance at earlier tests (i.e., at start, 3 months, 6 months, and 9 months) was not significantly different. *Notable stability across many sessions and many months is encouraging, and a possible explanation is that the task is appropriately structured to provide scaffolding and multiple* *cues (presented in a pre-specified temporal order; Figure 1) for individuals with Alzheimer-type dementia.*

Eventual performance decline is represented in the significant difference between performance after 14 months and performance at all previous dates (as tested by a within-subjects ANOVA). Thus, repeated CPU sessions do not appear to have completely inoculated participants with dementia against decline on the task. However, short-term stability did occur (i.e., over 9 months). Limitations of this and the following tasks include a small sample, group testing (which might have contaminated experimental measures of performance despite our efforts to conduct objective assessment), and the presence of additional enrichment activities that might confound the independent variable of repeated CPU practice.

Task #2: World Landmarks [5]

Procedures for the World Landmarks (WLM) activity are nearly identical to those for CPU. Stimuli were not, however, index cards with stickers. Instead, they were photo-quality images of highly recognizable, famous places from around the globe (e.g., the Eiffel Tower). Stimuli were the Statue of Liberty, Washington Monument, Leaning Tower of Pisa, Eiffel Tower, Mount Rushmore, Egyptian Pyramids in Cairo, a Japanese Pagoda, the White House, Big Ben (Bell Tower, Houses of Parliament, London), a London Call Box (the "red phone booth"), a windmill in Holland, the Iwo Jima Monument, a photo along the Grande Canal (Venice), and Neuschwanstein Castle (Germany). The stimuli were chosen as landmarks that we thought people from World War I and World War II generations would recognize easily.

Most WLM stimuli were on pages of 8.5 in X 11 in, with photos enlarged to fill the page. Four of the stimuli lacked clarity at this large size and were reproduced as ½-pages, instead. Thus, during any given round in the WLM activity, a participant might receive a combination of full- and ½-sized pages. Most of the images came from educational resources for geography teachers, personal photos, and antique postcards. All pictures were used solely for educational purposes.

This task was presented as a "geography trivia game", and the set-up for the task is the same as for CPU (above). Once each participant was seated with his/her stimuli, the researcher began by stating, "I am looking for something in New York." Then, after a pause—during which the researcher would wait to find out if anyone had recognition without being given the specific name of the landmark, the researcher would go on with: "I am looking for the Statue of Liberty. If you have a picture of it, please, pass it in." If a participant recognized a picture by the name of its home city/state/country, his/her performance was scored as 1.00 (i.e., 100%) for that picture. This is also true of those who recognized the landmark from one verbal prompt with its specific landmark name: 1.00 for that picture. So few participants recognized a picture by the verbal prompt of its location, that the two categories of performance (i.e., recognizing by location prompt and recognizing by name-of-landmark prompt) were collapsed in the overall analysis. [Note:

Recent experience of one of the researchers (Seifert) indicates that, for mixed activity groups which involve normal functioning and/or high-functioning individuals with dementia, it is especially useful and entertaining to start the round by prompting with the name of the city, because it provides a challenging cue for higher-functioning participants. Groups with particularly competitive players enjoy the race to discover who can match pictures with location cues.]

Next, as in CPU, the researcher would walk around the table saying, "I am looking for a picture of the Statue of Liberty. If you have it, please, pass it in." Generally, this would lead participants to hold up their pictures toward the researcher and away from participants. In both CPU and the WLM activities, it was improbable that one participant would easily see the picture being handed in by another player. Players were spaced far apart at the table, and each player held the picture away from other players and toward the researcher when passing it in. Participants were periodically reminded to look only at their own pictures and not at those of others. Still, the possibility that the group testing procedure sometimes permitted one player to "cheat" by seeing the performance of another player cannot be ruled out completely. Data from one participant, who routinely looked to others for help, were eliminated from further analysis.

As a round continued, the researcher would check for players who had not responded. She would address them by name, "[NAME], do you have a picture of the Statue of Liberty?" while motioning his/her hand in the direction of the player's stimuli (without pointing at any specific picture). Finally, as the round drew to a close, the researcher would walk around the table with a photo of the stimulus that had been called. "[NAME], do you have a match for this? Does one of your pictures match this one?" In WLM (unlike CPU), identity matching was possible after the researcher held up a sample picture, because all examples of a specific stimulus were identical.

The order of stimulus probes across rounds was random. One round might begin with the researcher asking for a picture of a landmark in Italy (e.g., Pisa), and another might begin with New York (i.e., the Statue of Liberty as exemplified here). Another round might begin with the city prompt of Washington, D.C. (e.g., the Washington Monument).

Data are reported for 11 persons (all females) aged 70 – 97 (MEAN = 86.5, SD = 6.72; with three ages held back at request of family/facility, with assurances that subjects met our age criterion of at least 70 years and with late-onset type AD). Individuals were residents in long-term care with a diagnosis of probable or possible Alzheimer's disease (made by a licensed physician). The range of initial MMSE scores was 5 – 21 (MEAN = 14.09, SD =5.69, N = 11), with cognitive assessments occurring within six months of the start of this study. Ending MMSE scores from 0 – 20 were available for nine participants (MEAN = 12.28, SD = 8.44). See Table 2 for notes and for participants' scores across sessions. Criteria for inclusion of participants' data in the WLM analysis were the same as those for the CPU analysis—noting that a participant's record must include performance data for all four sessions of WLM (initial, 3 months, 6 months, & 12 months).

A within-subjects ANOVA of mean performance (proportion-correct) revealed stability across 3 months, $p > .05$. Thus, performance was maintained across the first three months of testing. There was non-significant decline at 6 months [with F (1, 10) = 3.72, $p = .083$, *MSE* = .063, for the comparison between 6-month performance and the previous time's data]. It was *only* at the most distal time (after 12 months) that performance decline was statistically significant, with F (1, 10) = 5.08, $p < .05$, *MSE* = .058. As in the CPU activity, decline at the distal test indicates that disease processes do eventually seem to interfere with performance in explicit recognition tasks—even when performance has remained stable over many previous months. WLM suffers similar limitations to the ones described for CPU.

for Table 2, see the next page...

Table 2
World Landmarks:
Proportion-correct Scores (Initial, 3 months, 6 months, 12 months)

Subject (all female)	MMSE Start – End	Starting Age**	Time 1	Time 2	Time 3	Time 4
1	10–unknown	**	0.75	0.88	0.50	0.75
2	7.5–unknown	**	1.00	0.50	0.50	0.08
3	5 – 2	**	0.17	0.17	0.08	0.08
4	19 – 19	83	1.00	0.63	1.00	0.75
5	19 – 16.5	85	1.00	0.50	0.34	0.50
6	18.5 – 17	75	1.00	0.67	0.50	0.83
7	18 – 20*	97	1.00	0.83	0.83	1.00
8	17 – 14	90	1.00	0.83	1.00	0.50
9	21 – 20	91	1.00	1.00	1.00	1.00
10	8 – 0	89	0.75	0.50	0.05	0.00
11	12 – 2	82	0.05	0.42	0.42	0.00

*This might have been due to earlier illness, after which her functionality was slightly improved overall.

**Age/DOB held back by family. Assurances given that participant was > 70 years.

It should be noted that the CPU and WLM activities shared 7 subjects, who took part in both activities. The two tasks' common procedures might have permitted some bootstrapping from one to the other. Chronologically, CPU preceded WLM: with CPU occurring over 14 months and WLM beginning within 3-5 months of CPU's end for most common participants. An interesting note is that, most participants who were common to CPU and WLM, started WLM at or near their level of ending performance on CPU. This might indicate a transfer effect from CPU to WLM, and that is a logical conclusion to draw—given that the procedures were very similar across the two tasks (i.e., receive several cards/pictures; hear instructions to hand-in a particular one; find that stimulus and pass it in). Notice, however, that the stimuli were considerably more difficult to recognize in WLM than they had been in CPU (e.g., the Eiffel Tower v. dogs). And this is probably due, in part, to the fact that WLM stimuli were subordinate-level exemplars (specific examples of landmarks/buildings), while the CPU pictures were "one level *less specific*" in the schematic organization of conceptual hierarchies (Rosch, 1978; Rosch & Mervis, 1975). The CPU pictures were basic-level concepts (with their labels being, thusly, generally more available in semantic memory; e.g., bird, dog, cat, flower, compared to subordinate-level concepts like canary, bulldog, Cheshire cat, or daisy; Rosch). Comparing the difficulty of the CPU and WLM tasks, we would assert that WLM is the more difficult task. Research on naming and categorization indicates that specific examples of landmarks (subordinate-level concepts) would be more difficult to retrieve from memory than the names of basic-level concepts (as in the CPU task; Rosch, Mervis, Gray, Johnsen, & Boyes-Braem, 1976). If I ask a participant to name a picture, s/he is more likely to respond that, "it is a horse," than to say that, "it is a gelding."

Task #3: Magazine Treasure Hunt

The third study reported here is the most divergent in its techniques. Magazine Treasure Hunt, or MTH, is a popular activity in dementia care. It has been described as Magazine "Scavenger" Hunt by Dowling (1995, p. 72) and is widely used. Participants were seated around a large table, and each one was given a different (but similar) magazine or catalog to view. In our study, catalogs and magazines are screened, so that we have confidence of the appearance of photos of our stimuli in them. They are also screened to eliminate instances with large text labels next to photos, and in most catalogs, the text is so small as to be minimally distracting. After all, if we aim to help participants recognize pictures on their own, and from our verbal prompts, then it is important to be relatively certain that instances do not appear with giant text labels next to them (like the word "shoe" with a picture). Because some of the MTH participants also took part in CPU or WLM (with 4 subjects being in all three activities), we thought it was important *not* to duplicate specific word and picture probes across the three tasks. Generally, the timing of MTH was during the months of transition from CPU to WLM. Thus, the procedurally-based MTH-task was part of a person's activity enrichment program around the same point in time that s/he might also be taking part in other activities, including final sessions of CPU and initial sessions of WLM.

It is important to note that participants were taking part in many weekly activities for enrichment (e.g., bowling, basketball, watching movies, sewing), and attempts were made to diversify tasks, such that "dog" (for example) would be a stimulus in one activity (like CPU) but not in other activities. In MTH, probes were spoken prompts corresponding to high frequency, basic-level concepts from Snodgrass and Vanderwart's (1980) picture norms, like: shoe, man, woman, child, car, house, shirt, horse, airplane, and the like. Student helpers were instructed not to call dog and cat, but *occasionally* they did. Nevertheless, we included all data (including the rare call of "dog" and "cat") in the MTH results (below).

As a round began, the researcher would say, "Please, look for a picture of a shoe (see Figure 2, at this chapter's end, for a summary of MTH probes and procedures). In this game, you receive one point for each item you find." As she spoke, the researcher would walk around the table, saying, "Let me know if you find a picture of a shoe." A key difference in this activity relative to the previous two is that it can be much more easily self-paced, and participants can look at things they enjoy in the magazines and catalogs while they are looking for the probe item. This seems to lead some participants into somewhat incidental identifications. That is, they become engrossed in the many pictures in a catalog and hear the researcher say, "Have you found a picture of a shoe?" To which a subject might respond, "Well, yes. There's a shoe right here," while pointing to a picture on the page s/he is studying. In that respect, this task is more "procedural" or "implicit" in its demands. Also, the task is much less likely to put a participant "on the spot", such that s/he feels like it's a test. Instead, the task seems much more like one of amusing oneself with pictures, rather than one of being tested on picture recognition. In contrast, "test" demand was higher in CPU and WLM—tasks which call upon the individual to recognize a picture and pass it to the activity leader.

As a round of MTH continued, the researcher would restate the main goal several times over, "We're all looking for pictures of shoes. Let me know if you find one, so that I can give you a point for it." In this game, too, the group leader ("researcher") will eventually hold up a sample from among those that participants have found. When someone has found a shoe, and after some time has elapsed, the researcher will hold up the sample for everyone and state, "Look everyone, [NAME] has found another shoe. Isn't this an interesting and stylish one?" This can provide an opportunity for probing the less savvy players with a picture before ending the round: "[NAME of player who hasn't found a shoe], have you found any pictures of shoes like this one?" Note: Like CPU, MTH does not provide a chance for identity matching, because no two magazines/catalogs are the same and neither are their pictures. Another difference in MTH, relative to CPU and WLM, is that holding up a picture that someone has found in MTH is *reinforcing/rewarding* to the participant who found it, because s/he can receive a point for finding the picture *and* the successful "find" is announced to the group.

Data from MTH are reported as mean proportion-correct scores. Please, see Table 3. Nine individuals (1 male) with diagnoses of probable or possible Alzheimer's disease (via a licensed physician) took part. They were aged from 70 – 91 (MEAN = 86.8, SD = 4.92; for available ages, with four individuals' ages missing; as explained in CPU, above). Starting MMSE scores were 5 – 21 (MEAN = 10.78, SD = 5.64, N = 9). Ending MMSE scores from 0 – 20 were available for six participants (MEAN = 7.25, SD = 8.78). Inclusion criteria for a participant's results in the MTH analysis were the same as for CPU and WLM (above), except that only three sessions of data were included in MTH analyses (i.e., initial, 3 months, & 6 months).

Table 3
Magazine Treasure Hunt:
Proportion-correct Scores (Initial, 3 months, 6 months)

Subject	MMSE Start – End	Starting Age**	Time 1	Time 2	Time 3
1	8.5–unknown	**	0.20	0.50	0.60
2	10– unknown	**	0.90	1.00	1.00
3	7.5–unknown	**	0.00	0.10	0.80
4	5 – 2	**	0.00	0.10	0.60
5 (male)	12 – 5	79	0.05	0.10	0.10
6	19 – 16.5	85	0.50	1.00	1.00
7	21 – 20	91	1.00	1.00	1.00
8	8 – 0	89	0.20	0.20	0.60
9 (male)	6 – 0	90	0.00	0.25	0.20

**Age/DOB held back by family. Assurances given that participant was > 70 years.

A within-subjects ANOVA revealed some *improvement in scores over six months*, F (2, 16) = 8.78, p < .01, MSE = .03 (see

Table 3). That statistical result is especially noteworthy, because participants' MMSE scores indicate cognitive decline over their interval of involvement! A rationale for overall stability and/or improvement in the MTH task is given in the “Summary and Conclusions” section, below. Of the three tasks (i.e., CPU, WLM, and MTH), it is performance on MTH that seems to benefit most from the procedural components associated with "searching behaviors." Our participants seemed to be very apt to sit down and start looking through magazines and catalogs, quite automatically, even when low-functioning. And over time, practice seems to have increased catalog-searching behavior.

As an illustrative case, consider one participant (initial MMSE = 5; ending MMSE = 2) whose performance was relatively stable early in the CPU study (see Participant #3 in Tables 1 and 2; see Participant #4 in Table 3). Her performance was 100% and 71% at the initial and 3-month CPU tests, respectively. After taking part in CPU for 14 months, her performance had declined to 25%. Just five months later, her initial score on the WLM task was 17%. Looking back, her initial CPU score is amazing, given that her MMSE was so low. Over months, she participated in activities, but her recognition scores steadily declined at distal sessions of CPU, and later, WLM**. Very intriguing is her performance in Task #3 ("MTH"). It actually improved from 10% to 60% during the same months that her WLM score was declining.** In many respects, this might have been due to the relative difficulties of CPU and WLM and their reliance on explicit/declarative memory processes. Alternatively, MTH could be performed from a platform of procedural skills (e.g., looking at catalogs, turning pages, making exclamations about what one sees). And honestly, it might be a more entertaining activity—boosting performance because participants are motivated to remark, "Look! I found a/n [name of object]."

Summary and Conclusions

Knopman and Nissen (1987) and, later, Poe and Seifert (1997) documented dissociable procedural skills (i.e., from declarative knowledge) in Alzheimer-type dementia. Rabbitt et al. (2001) pointed out greater benefits of repeated testing for older than for younger adults. Taken together, these findings might prescribe repetition of *procedures* as beneficial for individuals with AD.

Work by Rusted, Ratner, and Sheppard (1995) and their colleagues has indicated that subject-performed procedures can be maintained over many months in AD. Additional research by Hutton, Sheppard, Rusted, and Ratner (1996) indicated that subject "enactment" and contextual cueing at encoding and retrieval enhanced performance of a subject-performed task by individuals with Alzheimer-type dementia. In our activities, subjects are asked to perform procedures (like recognizing and passing in a picture that matches the group leader's verbal label). Also, the cueing at encoding and retrieval are generally the same (because each session is directed the same way and provides opportunities for encoding *and* retrieval). Thus, our tasks provide excellent opportunities for participants to **perform procedures while the context provides**

optimal cueing (encoding and retrieval matched) for a person with Alzheimer-type dementia.

In our study, those aspects of performance which depended most heavily on explicit memory suffered the most over time, and in the one task (MTH) for which **subject-performed, researcher-scaffolded procedures dominated and guided success**, participants with AD actually evidenced improvement over 6 months of practice. Our studies show that: for cognitive scientists who wish to understand Alzheimer's disease—and for caregivers in search of techniques to enrich the daily lives of those with AD—repetition of subject-performed, caregiver-guided procedures should be a key part of the activities that are implemented in dementia care. **The foregoing tasks are designed to build practice through repeated performance, while participants take part in enjoyable activities. Repeated performance might be one way to PAD ("practice against decline") in Alzheimer's and related dementia.**

With respect to the nature of our tasks, a comparison across these three activities indicates that repeating procedures (i.e., leafing through a magazine or catalog) is more beneficial than repeating facts (e.g., "Which building is the Eiffel Tower?") in maintenance of cognitive skills in AD. Moreover, when the repeated procedure involves cues that highly support performance (e.g., the catalog that is in front of me affords leafing through), then memory is scaffolded and performance can be maintained over time.

Figure 1. Card Pick-Up and World Landmarks: Procedural Prompts and Individual Scoring

Prompt	Instructions	Individual Scoring
1	LEADER STATES [To the whole group]: **"I am looking** for [object name, e.g., flowers, dogs]**. Please, pass in your** [object name repeated]**."**	1.00 point = individual correctly passes in a card with that object on it. 0.00 point = no correct pictures passed in.
2	After 60-90 seconds, the leader repeats Prompt #1	INDIVIDUAL SCORE: Same as for Prompt #1
3	LEADER STATES [To an individual who has not passed in a correct card]: **"**[Person's name]**, do you have any** [object name]? **Pass in your** [object name]."	0.75 point = correctly passes in a card with that object on it. 0.00 point = does not pass in a card, or passes in a card with a different object on it.
4	LEADER STATES [To individual, showing a card with the object on it]: **"**[Person's name], **do you have pictures that are like this/these?"**	0.50 point = correctly matching his/her card to objects on the card held by the group leader. 0.00 point = no such match

NOTE: Score for the day's performance is the individual's average score across the trials of the game for that day.

Figure 2. Magazine Treasure Hunt: Procedural Prompts and Individual Scoring

Step Number	Instructions	Individual Scoring
1	LEADER STATES [To the whole group]: **"Please, look for a picture of a/n** [name of item, such as *shoe, child, man, or shirt.*]. Try to find a picture of a/n [item name] **in your magazine or catalog, and then let me know or hold it up. In this game you receive one point for each picture."**	1.00 point = for a correct picture that the individual points out to the group leader. 0.00 point = no item indicated or an incorrect response.
2	After 60-90 seconds, the leader repeats Prompt #1	Same as for Prompt #1 [If played as a competitive game, players' scores can be written on a large poster or whiteboard.]
3	LEADER STATES [To an individual who has not found the item yet]: **"**[Person's name], **We are looking for a picture of a/n** [item name]. **Do you see one?"**	Scoring is the same as in Prompts #1 & #2, but reduced by 25%. Thus, a correct response = 0.75, while incorrect/no responses = 0.00
4	LEADER STATES [By now, someone will generally have found the item. Picking up that person's catalog and indicating the item while walking around the table]: **"Look!** [Person's name], **has found a/n** [item name]. **Have you found a picture of a/n** [object name]**?"**	0.50 point = correctly pointing after seeing the example. 0.00 point = does not respond, or responds incorrectly.
5	LEADER [To individual, showing a catalog with the object on it and pointing to that page]: Address him/her by name and repeat Prompt 4.	0.50 point = correctly pointing when questioned by the group leader. 0.00 point = no such match

NOTE: *Game scores* are used for awarding prizes, and are simply the total number of items found across all rounds. For more details about *research scores*: Footnote 6 for Chapter 6.

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