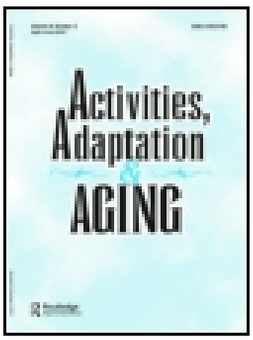

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Memory Interventions and Quality of Life for Older Adults with Dementia

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ABSTRACT. In this article we focus on memory remediation activities for older adults with cognitive impairment. Memory interventions that promote retention of simple information, such as a caregiver name, may have important emotional consequences for affected individuals and their families. The inclusion of memory activities in long-term care facilities offers a new and creative direction for programming with potential benefits for clients, staff, and families. We describe recent studies that demonstrate the efficacy of the *spaced retrieval technique* for improving memory for simple associations in older adults with probable Alzheimer's disease (AD). We present data that address quality-of-life issues for persons who participate in a spaced retrieval memory training program. These data strongly suggest that memory remediation activities should be included as a component of current best practices for memory-impaired older adults in long-term care settings.

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Programming for persons with adult dementia and related disorders is an important task for long-term care facilities. Current estimates on the number of nursing home residents that have some type of cognitive impairment is 70%, while close to 47% of nursing home residents have a diagnosis of dementia or Alzheimer's disease (AD) (Alzheimer's Association, 2007). Nursing homes are not the only care facilities that are impacted by residents with cognitive impairment. Current estimates hold that at least half of all assisted-living residents have some type of cognitive impairment (Alzheimer's Association, 2007). These numbers alone highlight the need for programming within long-term care facilities that benefit not only persons with cognitive impairment but also the staff that provides the care. Memory remediation and, more specifically, the spaced retrieval technique, is one such program. This article describes the spaced retrieval memory intervention and examines the intervention's impact on quality of life for persons with dementia.

Spaced retrieval (SR) is a technique used in nursing homes and assisted living facilities as a memory intervention for persons with adult dementia. Spaced retrieval utilizes shaping procedures and applies them to the acquisition and retention of information in memory (Abrahams & Camp, 1993). In SR, information is learned and retained by making active recall attempts over increasingly longer periods of time. For example, a person is taught a piece of information (e.g., a name) and then repeatedly tested at retention intervals that systematically lengthen over successful recall trials. If the person correctly recalls the information, the retention interval is increased. If the person is unsuccessful in their recall attempt, the information is restated to them and the next retrieval interval is reduced to the previous interval (Camp, Foss, O'Hanlon, & Stevens, 1996). The following schedule has been used with success. The first retention interval is 5 seconds and, if successful, the following intervals are 10, 20, 40, and 60 seconds. After a successful 60-second retention interval is demonstrated, retention intervals are increased by 30 seconds, contingent on a successful recall. After a 180-second (3 minute) retention is demonstrated, the intervals are expanded by 60 seconds following each successful recall. After a 360-second (6 minute) retention is demonstrated, the intervals are expanded by 120 seconds (see Cherry & Simmons-D'Gerolamo, 1999). During longer retention intervals the experimenter engages in general

conversation, unrelated to the memory task, with the participant. Training sessions are typically 30 minutes in length so that the participants do not become fatigued.

There are many benefits of SR as a technique for older adults with dementia. One benefit is that the technique is utilized in the context of a social visit, which creates a positive experience for the resident. Another advantage is the simplicity of the paradigm itself. The time intervals in spaced retrieval are basically a form of shaping the desired response, as previously mentioned. Even in failure the intervals are easily adjusted to ensure that the patient achieves success. The SR intervention appears to work without conscious effort in that the patient learns with minimal effort, which is another benefit (Camp & Stevens, 1990).

Recent studies have explored long-term effectiveness of the training (Cherry, & Simmons-D'Gerolamo, 2005) and applications have focused on the use of SR in rehabilitation therapy programs in nursing homes to train and maintain everyday function in persons with cognitive impairment (for a review, see Malone, Skrajner, Camp, Neundorfer, & Gorzelle, 2007). The broad applications for the use of the SR technique are beginning to be established and potential uses for persons with dementia are limitless.

SPACED RETRIEVAL AND MEMORY FOR SIMPLE ASSOCIATIONS

Spaced retrieval has been successful in training persons with dementia on a range of simple associations. Training has proven successful on the naming of forgotten familiar objects (Abrahams & Camp, 1993; Cherry, Simmons, & Camp, 1999; Cherry & Simmons-D'Gerolamo, 2004) as well as new objects such as a computer floppy disk (McKitrick & Camp, 1993). Participants were also successfully trained on a prospective task that required the participant to look at a calendar each day and read the task they were to perform (Camp et al., 1996). The implications of these past studies for programming within a long-term care facility are exciting. The potential training uses for SR to improve the everyday life for residents as well as staff is unlimited. Simple associations could be used to train residents to identify a variety of important locations including; activity room, restroom, dining room, and patient room, to name a few. Residents could also be trained to learn what time particular activities begin as well as how to participate in activities (e.g., throw the ball to the person on the right).

SPACED RETRIEVAL AND PROBLEM BEHAVIORS

Another area where SR has proven beneficial to residents and staff in long-term care facilities is managing patient problem behaviors. Alexopoulos (1994) utilized the SR technique to discontinue a patient's inappropriate sexual behavior. Spaced retrieval was used in treating a patient with severe cognitive impairment (score of 8 on the Mini-Mental State Exam [MMSE]) who was exhibiting sexually inappropriate behavior that included touching and verbal remarks to female patients and staff members. The participant was given a written statement that said "Ward rule: No touching females on the ward." The staff would ask him to read the note and then was questioned about the rule. After SR training was implemented the behavior eventually stopped and it became unnecessary to ask the patient to read the rule (Alexopoulos, 1994).

Spaced retrieval has been used in combination with fading cues to achieve success in discontinuing several problem behaviors found in patients with AD. Bird, Alexopoulos, and Adamowicz (1995) describe fading cues as graded cues sequentially given to the participant on each learning trial until retrieval occurs. The cue levels are slowly decreased or faded across trials and memory trace is consolidated. The cue is designed to assist in the recall of practical information. Many times interventions with AD participants prove unsuccessful because the patient never learns the association between the cue and object or behavior. For example, a door painted red is supposed to act as a cue for the restroom. This intervention is useless if the participant is never capable of understanding what the red door means. This study taught participants to associate a specific cue with a behavior or with information that was intended to modify behavior utilizing the SR method. The first participant was taught to associate a cue, a large colored sign, with the location of the toilet. The participant had been voiding in inappropriate places. The intervention was a success and inappropriate voiding was no longer a problem. The second participant had aggressive and disruptive behavior such as wandering into others' rooms and taking others' belongings. In a single 2-hour session, the participant was taught that a red stop sign means to stop and walk away. Daily entries into others' rooms dropped from an average of 43 per day to 2 per day. The third participant had a fear of soiling himself. He was taught to associate a beeper going off to signal the time to go to the bathroom. The participant slowly progressed to 2-hour intervals of the beeper. At follow-up a year later the participant continued to use the beeper and displayed no anxiety between trips to the restroom.

These are just a few examples of successful behavioral change with the implementation of the SR technique.

SPACED RETRIEVAL AND MEMORY FOR FACE–NAME ASSOCIATIONS

Memory for names and faces is an important part of everyday functioning. Spaced retrieval training has been conducted in long-term care facilities with the goal of teaching the persons to recognize caregivers and call them by name (Camp & Schaller, 1989; Clare, Wilson, Carter, Roth & Hodges, 2002; Joltin, Camp, & McMahon, 2003; Kesslak, Nackoul, & Sandman, 1997). Hawley and Cherry had success in a series of studies using SR to train persons with AD to remember name–face associations (Hawley & Cherry, 2004; Hawley, Cherry, Boudreaux, & Jackson, 2008). In addition to successfully learning a name–face association, these studies demonstrated that the learned association transferred to the live person target in most cases. That is, the person with AD was able to call the target person (the person whose name and face they were trained to remember) by name when he or she entered the room. These findings were particularly exciting for caregivers given the potential of teaching persons with AD to remember both family member and professional caregiver names and be able to use that name in social interactions.

SPACED RETRIEVAL AND DEMENTIA QUALITY OF LIFE

There is growing evidence that SR is a viable memory intervention for persons with dementia. However, little research has explored the potential noncognitive benefits of the SR intervention for persons with dementia. To address this issue, we included the Dementia Quality of Life Instrument (DQoL) (Brod, Stewart, Sands, & Walton, 1999) in two recent studies where participants were trained to remember name–face associations using the SR technique (see Hawley et al., 2008; Hawley, 2005). We expected that patients who performed well on the SR task would report improved quality of life post training.

The DQoL is a self-reported quality-of-life measure for persons with dementia (Brod et al., 1999). This measure includes the following 10 domains to conceptualize quality of life in dementia.

1. *Physical functioning.* Ability to perform basic physical activities such as walking, bending, and so on.
2. *Daily activities.* Activities of daily living (ADLs) and Instrumental Activities of Daily Living (IADLs).
3. *Discretionary activities.* Performance in activities such as hobbies, vacations, being active, and productivity.
4. *Mobility.* Ability to travel out of the house.
5. *Social interaction.* Social relationships.
6. *Interaction capacity.* Ability to interact with the environment, communicate, and comprehend.
7. *Bodily well-being.* Symptoms and bodily states reflecting physical comfort.
8. *Sense of well-being.* Positive and negative emotional and affective states and perceptions of self.
9. *Sense of aesthetics.* Sensory awareness, enjoyment and appreciation of beauty and nature, awareness and appreciation of surroundings.
10. *Overall perceptions.* Summary of ratings and evaluations about one's health and overall life situation.

The inclusion of a self-report quality-of-life measure, administered in conjunction with interventions for the dementia population, allowed for investigation of the impact interventions may have on patient quality of life. The DQoL was found to be psychometrically sound having good internal consistency, reliability, and construct validity (Brod et al., 1999). In addition, factor analyses have confirmed that patient reports represent appropriate psychological constructs (Ready, Ott, & Grace, 2007). A Japanese version of the DQoL has been created (Suzuki, Uchida, Kanamori, & Ooshiro, 2005) and other investigators are utilizing the measure in studies exploring quality of life in persons with dementia (Edelman, Fulton, & Kuhn, 2004; Selwood, Thorgrimsen, & Orrell, 2005).

Experiment 1

The first study that included the DQoL was designed to determine if a SR training schedule is superior to a uniform interval schedule. In this name–face intervention study, participants were taught to select a target photograph and state the target name, from eight other photographs, at increasingly longer retention intervals. A live person transfer task was administered to determine whether the name–face association would transfer to a live person. The live person target was the same target that was used in the training

sessions. Twelve participants with mild to moderate AD were recruited from local adult-care centers (age range: 76–91 years; 4 male, 8 female). Participants were randomly assigned to a SR or a uniform expanded retrieval (UR) schedule. In all, 12 individual sessions were held on 3 alternate days of the week, across a 4-week period. Sessions were conducted in a private area at the care center and lasted for approximately 1 hour or until the participant expressed fatigue. A hand-held stopwatch was used to control the trials for each group. Informed consent was obtained from the patient's legal guardian in advance of their participation in the study.

Training Sessions

At the beginning of each training session, the experimenter chatted informally with the participant to establish rapport and a 3-×-3 matrix board was placed on the table in front of him or her. The experimenter presented the pictures individually, naming each one (e.g., "this is Bob") until all nine pictures were placed on the board with one photo in each position on the matrix. Participants were then introduced to the sound of the beeper to ensure they could hear the sound that they would be trained to respond to in the upcoming trials. Next, they were told to select the "correct" picture and give it to the experimenter on cue. For example, "When the buzzer sounds, I want you to hand me the picture of Erin and tell me her name is Erin." In order for a trial to be considered successful, the response had to contain three elements: a visual cue (selecting the correct picture), a motor response (handing it to the experimenter), and a verbal response (stating the target's name). The position of the target item was changed after each trial to ensure that participants were learning the name–face association and not merely the spatial location of the picture.

The expansion schedule used in SR training was as follows. The first retention interval was 5 seconds. If successful, the participant's next interval was 10 seconds with subsequent intervals of 20, 40, and 60 seconds contingent on successful recall. For failed recall trials, direct feedback was given where the experimenter corrected the participant's error and restated the task instructions. For example, the experimenter would pick up the correct target picture and say, "This is actually Erin, when you hear my buzzer I want you to hand me this picture and tell me her name is Erin." On the next trial following a failed recall, the retention interval was reduced to that of the preceding trial where the participant had been successful. Participants tested in the uniform retrieval group received a predetermined number of trials

at a consistent retention interval in each session and was included in this study for control purposes (see Hawley et al., 2008).

Live Person Transfer Task

The "live" person was the individual whose picture served as the target picture during training. This live person target entered the room, handed the experimenter a phone message, and sat in an empty chair at the testing table. The experimenter gave the participant an opportunity to spontaneously recognize the live person target. If the participant gave no response, the experimenter implemented a series of prompts and cues that consisted of the following prompt: "This is my friend, do you know her name?" If the participant said no or did not respond, the experimenter included a further prompt: "Her picture is on the board. Would you hand me her picture?" If the participant still did not appear to recognize the target picture as the live target person, the experimenter handed the participant the correct picture (if he or she had not already selected it) and said, "Take another look at the picture, now can you tell me her name?"

Results indicated that the SR group outperformed their uniform retrieval counterparts on recall of the name–face association learned during the training sessions, as evidenced by better performance across training sessions and on the live person transfer task (for details see Hawley et al., 2008). The DQoL was administered to both training groups at pre- and posttest.

Table 1 contains participant results of pre- and posttraining performance on the DQoL. Overall, SR participants somewhat improved

TABLE 1. Mean scores and standard deviations on pre- and post-DQoL by participants

Scales	Groups			
	Spaced retrieval		Uniform retrieval	
	Pre	Post	Pre	Post
Self-esteem	3.79 (0.66)	4.29 (0.43)	3.67 (0.96)	3.29 (0.95)
Positive affect / humor	4.14 (0.74)	4.08 (0.48)	3.51 (0.87)	3.48 (0.68)
Absence of negative affect	3.73 (1.12)	3.92 (0.76)		3.64 (0.49)
Feelings of belonging	3.56 (0.83)	3.89 (0.78)	3.28 (1.39)	3.22 (1.05)
Sense of aesthetics	3.01 (0.93)	3.43 (1.35)	3.33 (0.38)	2.97 (1.21)
Overall quality of life	3.67 (0.52)	3.67 (1.03)	3.33 (1.03)	3.00 (0.89)

Note. Scores range from 1 to 5 with higher scores indicating a higher quality of life.

their rankings on all of the quality-of-life scales at posttest except for the positive affect and humor scales, where they decreased slightly. The uniform retrieval participants showed a different pattern in that their rankings on all of the quality-of-life scales decreased somewhat, except for absence of negative affect, where they reported an increase at posttest compared to pretest. Independent samples, *t* tests, were run to determine differences between groups at pretest and posttest on the six scales that comprise the DQoL. The SR ($M = 4.29$) group scored higher on the self-esteem scale in comparison to the uniform retrieval counterparts ($M = 3.29$), $t\ (11) = 2.34$, $p < 0.05$. While these trends are preliminary, they offer some evidence that the success obtained by the SR group appears to be transferring to the patients' feeling better about themselves, specifically their self-esteem and their quality of life.

Experiment 2

The second study to explore SR effects on quality of life examined the efficacy of the SR technique for learning a familiar name–face association, specifically, the name–face association of a family member or professional caregiver. A total of five persons with mild to moderate AD and no prior SR training were recruited from a local assisted-living center (age range: 67–89 years; 1 male, 4 female). All participants received spaced retrieval training on a *familiar* name–face association on alternate days of the week, across a 4-week period. Participants were trained using the same procedure previously outlined for the SR group with the target picture being that of a person familiar to the patient. The familiar target was selected with input from the patient's family and/or assisted-living staff. The positive effect of SR training on recall of the correct name–face association and transfer of that association was evident for the majority of participants (Hawley, 2005). Participants were administered the DQoL at pre- and posttest to determine potential effects on quality of life.

Table 2 presents participants' pre- and posttraining performance on the DQoL. On average, participants increased their ratings somewhat on all of the quality-of-life scales except for self-esteem and the absence of negative affect scale, where they decreased slightly (see Table 2). Independent samples, *t* tests, were run to determine differences between participants' rankings at pretest and posttest on the six scales that comprise the DQoL. The participants had higher rankings on the positive affect

TABLE 2. Pre- and posttest performance on the DQoL by participants

	Scales											
	Self-esteem		Positive affect / humor		Absence of negative affect		Feelings of belonging		Sense of aesthetics		Overall quality of life	
Participants	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
S1	4.25	4.00	3.33	4.17	3.73	4.09	3.33	3.67	2.80	3.00	4.00	4.00
S2	4.25	3.75	3.33	4.50	3.36	3.36	2.67	3.67	3.80	4.60	4.00	5.00
S3	3.00	2.50	2.33	2.67	4.00	3.45	2.67	2.00	3.20	3.20	4.00	4.00
S4	4.50	4.75	4.33	4.50	4.00	3.91	4.00	4.33	5.00	4.20	3.00	4.00
S5	4.00	4.50	4.67	5.00	3.64	3.55	3.00	4.33	4.80	5.00	4.00	4.00
Mean	4.00	3.90	3.60	4.17	3.75	3.67	3.13	3.60	3.92	4.00	3.80	4.20

Note. Scores range from 1 to 5 with higher scores indicating a higher quality of life.

scale at posttest ($M = 4.17$) in comparison to pretest ($M = 3.59$), $t(4) = 2.34$, $p < 0.05$. These trends are preliminary, but offer some evidence that the success obtained via SR training appears to be transferring, even if slightly, to the patients' feeling better about their quality of life. In addition, there is evidence that learning and applying the name–face association may improve patient perceptions of quality of life. Interestingly, the two subjects who called the target by name outside of testing (S2, S5) scored higher on the majority of scales in the DQoL after training (see Table 2). These findings are exciting in that the intervention may produce memory gains that extend to applying the knowledge outside of a training session and impact participants' quality of life.

Taken together, the studies offer the first findings of noncognitive benefits associated with the SR intervention. Results suggested that increased quality-of-life scores were linked to successful SR performance. In Experiment 1, pre- and posttest DQoL revealed higher scores on four of the five scales for the adjusted SR group, whereas the uniform retrieval group had lower scores on four of the five scales after training (see Table 1). The differences in group performance on quality of life after training likely imply that social contact alone does not account for the gains in quality of life observed in the spaced retrieval group. Perhaps actual memory successes contributed to an increase in the quality-of-life scores, which would explain the pattern observed between the two groups in posttest quality of life.

Experiment 2 also provided evidence that successful SR training on a familiar name–face association may lead participants to report higher quality of life. In particular, two of the four participants (S2, S5) who had success in training called the target by name when the target was encountered outside of testing. These two participants scored particularly high at posttest on the feelings-of-belonging scale. Both S2 and S5 increased their feelings-of-belonging score at least a full point higher at posttest in comparison to the pretest score on this scale. This finding may indicate that calling a familiar person by name raises feelings of quality of life in cognitively impaired older adults.

CONCLUSION AND FUTURE DIRECTIONS

Memory remediation interventions offer an exciting new direction for activities programming in long-term care facilities. These current findings have revealed a value added advantage of a SR task in a long-term care

setting. Spaced retrieval training produces successful gains not only in memory but also in the quality of life for the participant. Memory remediation activities, such as spaced retrieval, are easy to implement and could with minimal effort become part of an activity program within a facility to produce gains in quality of life for the patient as well as potential gains for caregivers and staff. For example, when a person with dementia calls a caregiver by name it may promote a more positive relationship between patient and caregiver because the patient feels empowered that he or she can call a person they see regularly by name and the caregiver feels a sense of connection when called by name. Another potential positive would be the ability of a person with dementia to call fellow residents by name. Such an outcome may increase the likelihood of AD patients participating in group events, which can be a challenge in long-term care facilities. A future direction might be to measure quality of life by responses of a family member as a proxy in addition to the self-reported DQoL to determine if additional gains may be reported.

In addition to SR, other intervention programming has been explored in long-term care settings and is showing positive psychosocial effects. For example, Skranjner, Malone, Camp, McGowan, and Gorzelle have been investigating the usefulness of Montessori-Based Dementia Programming (MBDP) as a method for presenting interventions in nursing homes and assisted-living facilities (2007). This programming is based on Montessori educational techniques and focuses on maintaining skills that foster independence in dementia patients. A study across four sites found MBDP to be an effective intervention for engaging persons with dementia as evidenced by increases on two subscales from the Menorah Park Engagement Scale; constructive engagement defined as motor or verbal behavior in response to target activity (e.g., turning the page of a booklet, answering a question) and pleasure, defined as observed laughing or smiling (Skrajner, Malone, Camp, McGowan, & Gorzelle, 2007). The positive effect of MBDP programming for patients in long-term care facilities is encouraging.

In closing, the results of these studies using the SR intervention and the effects on quality of life are promising. Our findings add to the small but growing literature showing that interventions for persons with dementia can produce improvement on psychosocial measures such as affective scores (Kesslak et al., 1997) and quality of life in nursing homes (Simard, 2000). Further research is warranted to demonstrate the reliability and generality of the present results, which suggest that self-rated quality of life may be linked to success on the SR task.

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