



**AOTA Critically Appraised Topics and Papers Series**  
**Alzheimer's Disease**

*\*A product of the American Occupational Therapy Association's  
Evidence-Based Literature Review Project*

**CRITICALLY APPRAISED PAPER (CAP)**

***Focused Question***

**What is the evidence for the effect of interventions designed to modify and maintain perceptual abilities on the occupational performance of persons with dementia?**

Namazi, K. H., & DiNatale J. B. (1992). The effects of environmental barriers on the attention span of Alzheimer's disease patients. *American Journal of Alzheimer's Care and Related Disorders and Research*, Jan-Feb, 9-15.

**PROBLEM STATEMENT (JUSTIFICATION OF THE NEED FOR THE STUDY)**

State the problem the authors are investigating in this study.

Research has shown that attention plays a significant role in distractibility, but it is not yet understood how attention is affected by Alzheimer's disease (AD). The literature is contradictory and empirical research is lacking for the impact of environmental interventions on attention or distractibility.

**RESEARCH OBJECTIVE(S)**

List study objectives.

"The aim of this project is to provide empirical evidence for specific environmental interventions which would benefit individual patients with AD... (and).. to see if it encourages independence and supports remaining skills" (p. 9). The environmental intervention being studied is a visual barrier.

Describe how the research objectives address the focused question.

This study aims to use and foster maintaining perceptual abilities, visual perception specifically, to optimize engagement in meaningful activities by focusing attention to the task.

**DESIGN TYPE:**

Quasi-experimental, one group randomized cross-over design

**Level of Evidence:**

III

Limitations (appropriateness of study design):

Was the study design type appropriate for the knowledge level about this topic? *If no, explain.*

Yes

No

**SAMPLE SELECTION**

**Inclusion Criteria**

Program supervisory staff and coordinators had input on which residents would be likely candidates. This was combined with the patients' scores on various neuropsychological tests. Nothing more explicit is stated related to inclusion criteria. All subjects were residents of the Corinne Dolan Alzheimer Center; a facility which supports patients with AD in early and middle stages.

**Exclusion Criteria**

Visual disturbances and residents unlikely to cooperate.

Sample Selection Biases: *If yes, explain.*

Volunteers/Referrals

Yes  Residents were encouraged, but not required, to participate in the study

No

Attention

Yes

No

Others (list and explain):

**SAMPLE CHARACTERISTICS**

N=12

% Dropouts	20%, gender not reported		
# (%) Male	2	# (%) Female	10
Ethnicity	NR		
Disease/disability diagnosis	AD w/Mini Mental State Examination (MMSE) range from 10–20, no concomitant diseases reported, mean age 79.4 years		

NR = Not reported

Check appropriate group:

<20/study group	20–50/study group	51–100/study group	101–149/study group	150–200/study group
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Sample Characteristics Bias: If no, explain.

If there is more than one study group, was there a similarity between the groups?

Yes

No

Were the reasons for the dropouts reported?

Yes

No  Only stated that subjects were unable to or unwilling to participate.

**INTERVENTION(S)**—Included are only those interventions relevant to answering the evidence-based question.

*Add groups if necessary*

<p>Three barrier heights were tested (described below). Barrier heights were randomly assigned by specific day, time of day, wing location, and subject. Each subject participated in 12 trials. 2 subjects were tested in each 20 minute trial period. Subjects were grouped into categories based on MMSE score group: Group 1 = MMSE score of 20; Group 2 = MMSE score of 14–16; Group 3 = MMSE score of 10–11.</p>
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### Group 1

Brief Description	78” removable divider provides a visual barrier so that no activity in the corridor is visible from a seated position. The divider was a portable screen made of a neutral colored fabric. Age-appropriate color-by-number art projects were selected for 11 of the 12 subjects. The 12 <sup>th</sup> subject was not able to engage in the art project and coin sorting was a substituted activity for this person.
Setting	A central common area of the Corinne Dolan Alzheimer Center (CDAC) facility.
Who Delivered?	A trained observer, who also served as a model, as this person participated in the project and kept track of distractions
Frequency?	4 trials of each condition, 20 minutes at a time
Duration?	Over 4 weeks

### Group 2

Brief Description	A 54” removable divider provided a visual barrier that defined physical space, but did not exclude all visual distractions. The divider was a portable screen made of a neutral colored fabric. Age-appropriate color-by-number art projects were selected for 11 of the 12 subjects. The 12 <sup>th</sup> subject was not able to engage in the art project and coin sorting was a substituted activity for this person.
Setting	A central common area of the CDAC facility
Who Delivered?	A trained observer, who also served as a model, as this person participated in the project and kept track of distractions
Frequency?	4 trials of each condition, 20 minutes at a time
Duration?	Over 4 weeks

### Group 3

Brief Description	No barrier. Age-appropriate color-by-number art projects were selected for 11 of the 12 subjects. The 12 <sup>th</sup> subject was not able to engage in the art project and coin sorting was a substituted activity for this person.
Setting	A central common area of the CDAC facility
Who Delivered?	A trained observer, who also served as a model, as this person participated in the project and kept track of distractions
Frequency?	4 trials of each condition, 20 minutes at a time
Duration?	Over 4 weeks

Intervention Biases: Explain, if needed.

Contamination

Yes

No

Co-intervention

Yes

No

NR

Timing

Yes

No

Site

Yes

No

Use of different therapists to provide intervention

Yes

No

NR

**MEASURES AND OUTCOMES**—Included are measures relevant to answering the focused question.

Name of measure:

No formal measure stated, but authors describe seven categories of distractions that were tallied by the observer if the subject engaged in them for more than 5 seconds.

Outcome(s) measured (what was measured?):

Seven categories of distraction: Outside visible, outside audible, outside talk, resident talk (to outsider), resident talk (to observer), resident leaves, or internal (undetermined).

Is the measure reliable (as reported in article)?

Yes

No

NR

Is the measure valid (as reported in article)?

Yes

No

NR

How frequently was the measure used for each group in the study?

At each 20 minute intervention

Measurement Biases

Were the evaluators blinded to treatment status? *If no, explain.*

Yes

No  Evaluators were aware of barrier type

Recall or memory bias *If yes, explain.*

Yes

No

Others (list and explain):

Limitations (appropriateness of outcomes and measures) *If no, explain.*

Did the measures adequately measure the outcome(s)?

Yes

No  It is possible that it was difficult to keep track of all distractions and note which ones were continuing for 5 seconds or more while also participating in the task. The measure may have been improved by recording the sessions.

## RESULTS

List results of outcomes relevant to answering the focused question

Include statistical significance where appropriate ( $p < 0.05$ )

Include effect size if reported

Time spent on project Range 85–1200 seconds

Avg. 1130 seconds

With High Barrier, avg. time 1164

	Avg. time @ task	# distractions
High Barrier	1164 s	87
Low Barrier	1146 s	100
No Barrier	1155 s	296

There was a reduction in the overall number of auditory distractions in the Low and High Barrier conditions.

Subjects grouped by their MMSE scores to determine additional attentional differences.

Group 1: 3 subjects with MMSE of 20

Group 2: 3 subjects with MMSE 14–16

Group 3: 5 subjects with MMSE 10–11

# and (%) distractions in each condition

	No Barrier	Low Barrier	High Barrier
Group 1	58 (19.6)	9 (9.0)	8 (9.8)
Group 2	111 (37.5)	25 (25.3)	16 (19.5)
Group 3	127 (42.9)	65 (65.7)	58 (70.7)

Subjects with lower MMSE scores were more distracted than the other groups.

Was this study adequately powered (large enough to show a difference)? *If no, explain.*

Yes

No  12 subjects, no power analysis reported

Were appropriate analytic methods used? *If no, explain.*

Yes  (Descriptive statistics only)

No

Were statistics appropriately reported (in written or table format)? *If no, explain.*

Yes

No

## CONCLUSIONS

State the authors' conclusions that are applicable to answering the evidence-based question.

Visual barriers may reduce the impact of auditory distractions. Lower MMSE scores were associated with more distractions and less time spent on task. However, the authors state that contrary to reports that reduced attention span is characteristic of AD, the participants in this study exhibited remarkable ability to attend to a task. They admit that "it is still unclear how disease severity and sensory sensitivity to environmental stimuli are related to distractibility.

For those who are least impaired, a barrier appears to decrease distractibility and may support attention span and increased concentration" (p. 14). They state that the ability of subjects to sustain attention for 16 out of 20 minutes, even with no barrier, speaks to the importance of engaging people with dementia in meaningful activities and further supporting their attention with visual barriers. They suggest some interesting ideas for future research including using barriers to support attention span in activities of daily living, such as dressing, or shielding someone in a busy household.

Were the conclusions appropriate for the Study Design (Level of Evidence)? *If no, explain.*

Yes

No

Were the conclusions appropriate for the statistical results? *If no, explain.*

Yes

No

Were the conclusions appropriate given the study limitation and biases? *If no, explain.*

Yes

No

## IMPLICATIONS FOR OCCUPATIONAL THERAPY

This section provides guidance about clinical practice, program development, and other implications of the study findings as they relate to the focused question.

One of the most interesting implications for occupational therapy arising from this study is the ability of people with moderate to mild AD to attend to a task that is meaningful and dignified (an average of 16 out of 20 minutes). This attention was enhanced in most cases by the use of a visual barrier, which also decreased attending to auditory distractions. This has implications for possible use in residences where there are often large common areas used for group programming, and also possibly for home use in helping a person stay on task with dressing, eating, or other activities of daily living. In addition, it could be used in a busy household to decrease attention to irrelevant auditory stimuli. The barriers have the benefit of being relatively inexpensive and portable. The authors were not able to explain the anomaly in the data which showed that the low barrier may have adversely affected attention in the group of subjects with the lowest MMSE scores. Further research is required to replicate these findings with a higher level of evidence.

This work is based on the evidence-based literature review completed in August 2005 by Lori Letts, PhD, OT Reg. (Ont.); Jacqueline Minezes, BSc (OT), OT Reg. (Ont.); Julie Berenyi, BHSc (OT) OT Reg. (Ont.); Mary Edwards, MHSc, OT Reg. (Ont.); Kathy Moros, BHSc (OT), OT Reg. (Ont.); Colleen O'Neill, BSc (OT), OT Reg. (Ont.); and Colleen O'Toole, MSc (OT), OT Reg. (Ont.).

CAP Worksheet adapted from: Critical Review Form – Quantitative Studies ©Law, M., Stewart, D., Pollack, N., Letts, L., Bosch, J., & Westmorland, M., 1998, McMaster University. Used with permission.

For more information about the Evidence-Based Literature Review Project, contact the American Occupational Therapy Association, 301-652-6611, x 2052.



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