



AOTA Critically Appraised Topics and Papers Series
Traumatic Brain Injury

**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 to address cognitive/perceptual functions (attention, memory, executive functions) on the occupational performance for persons with traumatic brain injury (TBI)?

Wright, P., Rogers, N., Hall, C., Wilson, B., Evans, J., & Emslie, H. (2001). Enhancing an appointment diary on a pocket computer for use by people after brain injury. *International Journal of Rehabilitation Research*, 24, 299–308.

PROBLEM STATEMENT (JUSTIFICATION OF THE NEED FOR THE STUDY)

State the problem the authors are investigating in this study.

Paper-based memory aids require skills in planning and remembering. Electronic aids with alarms circumvent the problem of remembering to look, and paging systems have proved highly beneficial to some patients. A paging system requires the message to be changed by the server. An electronic reminding device that allows patients or carers to enter reminders could overcome this difficulty.

RESEARCH OBJECTIVE(S)

List study objectives.

Replicate previous work; examine the hypothesis that encouraging people to use a pocket computer more often for other activities, such as games, will reduce initiation difficulties and increase the use of the memory aid; and examine the generality that the interface will remain successful if it offers unambiguous options, thus minimizing the information to be remembered.

Describe how the research objectives address the focused question.

Occupational therapists use various types of memory aids to enhance occupational functioning of people with brain injury and other disorders characterized by memory deficits. This article purports to evaluate which of two types of computers is best, whether a custom-designed interface is useful, and whether games entice greater use of the computer.

DESIGN TYPE:

A replication of previous study reported in *Brain Injury*. One group, repeated measures, counterbalanced design.

Level of Evidence:

II

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

How were subjects selected to participate? Please describe.

NR

Inclusion Criteria

NR

Exclusion Criteria

NR

NR = Not reported.

Sample Selection Biases: *If yes, explain.*

Volunteers/Referrals

Yes no information given

No

Attention

Yes

No

Others (list and explain):

SAMPLE CHARACTERISTICS

N = 12; mean age = 39 years (range: 19–57); mean duration since injury = 3 years (range: 1–10 years). Two had used NeuroPage.

% Dropouts

(%) Male

(%) Female

Ethnicity

Disease/disability diagnosis

Check appropriate group:

<20/study group <input checked="" type="checkbox"/>	20–50/study group	51–100/study group	101–149/study group	150–200/study group
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Sample Characteristics Bias: If no, explain.

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

Yes Same group, different conditions, counterbalanced order

No

Were the reasons for the dropouts reported?

Yes

No

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

Overall experiment lasted 21 weeks. 1st week: researcher explained the purpose of the project, discussed the memory aids the person was currently using, demonstrated the functionality of both computers, administered tests of visual acuity and manual dexterity, demonstrated the memory aids on one of the computers, and loaned the computer to the patient. 2nd week: follow-up. 6th week: telephone interview. 9th week: reclaimed computer. 14th week: demonstrate other computer. 15th week: repeat of week 2. 18th week: repeat of week 6. 21st week: collect second computer.

Training in weeks 1 and 14: Training followed by a manual with pictures of the various screens. In the 2nd and 15th week, they were asked to demonstrate use of the computer to verify that they could use it. They had the telephone numbers of the researchers for technical assistance.

Both computers had the following memory aids: appointment diary, notebook, and to-do list. The diary and notebook were linked so that from a diary entry, participants could link to a notebook page containing details about the situation of the diary entry. An alarm could be set for any diary entry and/or an entry could be repeated daily by ticking boxes on the screen. The to-do list had no auditory reminder, but could be ticked off when done. Three games chosen to encourage planning and remembering were included in each computer. The first computer had Pairs, Hangman, and Mosaic; the second had Chess, Crosswords, and Solitaire.

Add groups if necessary

Group 1—Condition 1: Computer aid with physical keyboard

Brief Description	Hewlett Packard (HP) 360 LX with 8 MB RAM and screen resolution of 640 x 240 pixels, occupying 154 x 62 cm in landscape orientation. Text was entered via the keyboard, but all interactions were made by tapping the screen with the pen provided.
Setting	NR
Who Delivered?	Self
Frequency?	NR
Duration?	2 months

Group 2—Condition 2: Computer aid with on-screen keyboard

Brief Description	Casio E10 with 8 MB RAM and screen resolution of 240 x 320 pixels, occupying 80 x 60 cm in portrait orientation. Text was entered and all interactions were made by tapping the screen with the pen provided.
Setting	NR
Who Delivered?	self
Frequency?	NR
Duration?	2 months

Group 3—Condition 3: Baseline/washout period

Brief Description	
Setting	
Who Delivered?	
Frequency?	
Duration?	1 month

Intervention Biases: Explain, if needed.

Contamination

Yes

No counterbalanced design with 1-month washout period

NR

Co-intervention

Yes

No

NR

Timing

Yes

No probably not. Although 21 weeks is a long time, all participants were in chronic stage of recovery and unlikely to recover function. Some could have lost interest during the long period.

NR

Site

Yes

No

NR

Use of different therapists to provide intervention

Yes

No self-administered

NR with regards to training

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

Psychometric tests were administered but not of interest to this review.

Name of measure:

Attitudes of Satisfaction

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

Interview regarding attitude toward ease of use of computers and various memory aids on a 1–10 point scale

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?

Once, at end of each experimental condition

Name of measure:

Usage

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

Computer log files of the usage of memory aids

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?

Once, at end of each experimental condition

Measurement Biases

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

Yes

No probably not—not reported

Recall or memory bias *If yes, explain.*

Yes possible because the interview was repeated after the use of each computer; however, the counterbalanced order would have controlled for this

No

Others (list and explain):

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

Did the measures adequately measure the outcome(s)?

Yes the usage by computer tally

No interview relied on patient memory in a group of people with memory deficits

RESULTS

List results of outcomes relevant to answering the focused question

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

Include effect size if reported

I calculated the effect size, r .

All participants could use the computers and 83% (10/12) found them useful. Mean attitude ratings (maximum = 10) for appointment diary = 7.3; notebook = 5–6.7; to-do list = 5.8. Frequency games played = 5.4. The mean number of new entries made to each computer: Casio = 37 (± 33) and HP = 47 (± 43). The diary features used most often were auditory alarms (54% total entries) and repeated entries (46% total entries). People categorized as high users made significantly more new diary entries than people who were not ($t_{(10)} = 2.18$, $p < 0.05$, $r = .56$), which caused the researchers to suggest that a conceptual understanding of how to incorporate memory aids into daily living could be prerequisite for benefiting from electronic memory aids. The use of games did not correlate with the use of computer as memory aid (total number of diary entries): $r = .11$.

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

Yes

No

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

Yes the one that was included

No More statistical analyses could have been included and/or greater explanation of what scores were used for analysis (e.g., in calculating the use of games and use of memory aids).

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.

It was confirmed that people suffering from memory loss after brain injury can master purpose-designed electronic memory aids and find such aids of great personal benefit. The very positive attitudes toward the diary shown in both this and the previous study (Wright et al., 2001) (7.3 here and 7.6 in previous) confirms that an electronic diary benefits people with memory impairments. Games were enjoyed by many participants but they did not increase the use of the memory aids.

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 the positive attitudes do not confirm that the electronic diary benefits people in their daily life. Benefits to daily life were not measured.

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

Yes

No overstated the benefits based only on attitude on a 1 to 10 scale. The notebook and to-do lists were used relatively infrequently.

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.

This study confirms a previous study and provides evidence that memory aids (diary, notebook, links between the two, and a to-do list) on a handheld computer with a custom-designed interface to allow patients with brain injury to use the system by ticking off choices (problem-solving skills) rather than memory can be useful for some persons with brain injury. Although all participants were able to use the computers after training, only 83% (10/12) found them useful, indicating personal preferences affect choice of memory prosthetic appropriate for particular patients. There was no measure of effectiveness of the memory aids on occupational performance (medications, keeping appointments, etc.) which should be studied.

Reference

Wright, P., Rogers, N., Hall, C., Wilson, B., Evans, J., Emslie, H., et al. (2001). Comparison of pocket-computer memory aids for people with brain injury. *Brain Injury*, 15, 787–800.

This work is based on the evidence-based literature review completed by Catherine Trombly, ScD, OTR/L, FAOTA.

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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