

Memory Compensation Improvement Patterns for Adults with Traumatic Brain Injury

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Abstract

Compensatory strategies taught by speech-language pathologists to minimize the impact of memory impairments increasingly rely on assistive technology. This research documents recovery patterns of three adults with brain injury when using a wristwatch alarm or a digital recording and alarm device to increase their independence in remembering to take medications.

Background

- Memory impairments are prevalent among people with TBI
- With improvements in technology, use of electronic aids for memory compensation has become increasingly popular
- When introducing electronic memory aids to survivors of TBI, different patterns of improvement may emerge

Compensatory Strategies

Compensatory strategies and electronic aids must not tax motor, sensory, or cognitive functions typically impaired in people with TBI.

- Devices dependent on unimpaired vision, fine motor coordination or dexterity, or advanced reading comprehension are not appropriate for many survivors of severe TBI.
- selection of strategies and devices must account for unique strengths and challenges displayed by individual survivors.
- clinicians must recognize the importance of minimizing the conspicuousness of any strategies or devices they suggest for compensatory purposes.

Methods

Participants:

Three adult males with severe TBI

JW

- 30 years old
- Injured in a vehicle accident
- 14 months post-injury
- Completed 12th grade
- WAB Aphasia Quotient score = 97
- Decreased memory capacity
- Social, outgoing, has a positive attitude
- Gait disturbance when walking
- Poor awareness of deficits
- Adequate functional memory for activities of daily living
- Current medications included:

Amantadine	Tegretol
Colace	Naprosyn
Zantac	Lexopro
Senokot	Fish oil
Ritalin	

BG

- 33 years old
- Injured in a car/pedestrian accident
- 4 years post-injury
- Completed one year of college
- WAB Aphasia Quotient score = 98
- Limited memory capacity
- Used a Lightwriter as a primary means of communication; also used gestures, facial expressions, and vocalizations to gain attention
- Distractible and disinhibited
- Limited discrimination of salient and irrelevant information
- Attention, abstract reasoning, and problem solving deficits
- Current medications included:
 - Baclofen Tylenol Arthotec
 - Depakote ER Tylenol

DG

- 25 years old
- Injured in a motor vehicle accident
- 7 years post-injury
- Completed 12th grade
- WAB Aphasia Quotient score = 100
- Limited memory capacity
- Physically independent
- Voice production is affected by mild dysarthria
- Memory deficits limit independence in performing activities of daily living
- Current medications included:
 - Paxil
 - Dilantin
 - Asacol
 - Prevident 5000
 - Prevacid
 - Miralax

Materials

Medication Schedule Card

Name:			
Date:			
Research phase: Medication Card		WatchMinder	Voice Craft Organizer
Time	Medication	Taken	Independence
8:00am			Independent Cued
12:00pm			Independent Cued
4:00pm			Independent Cued
8:00pm			Independent Cued

Assistive Technology Devices

WatchMinder



Voice Craft Organizer



Research Design

- A-B-A-C-A alternating treatments design
 - Two-week “A” phases - medication schedule cards served as reminders
 - Two-week “B” phase - WatchMinder vibration served as reminder
 - Two-week “C” phase - Voice Craft Organizer alarm and message served as reminder
- Termination of treatment occurred when a participant demonstrated 100% independent performance across multiple days.

Procedures

- Each morning, a staff member presented and reviewed a participant’s medication card and, when appropriate, made certain he had the necessary AT device for that phase
- Participants were reminded to approach staff when it was time to take medication
 - When done independently, staff dispensed medication, supervised marking “taken” box, and circled the word “independent” on medication card

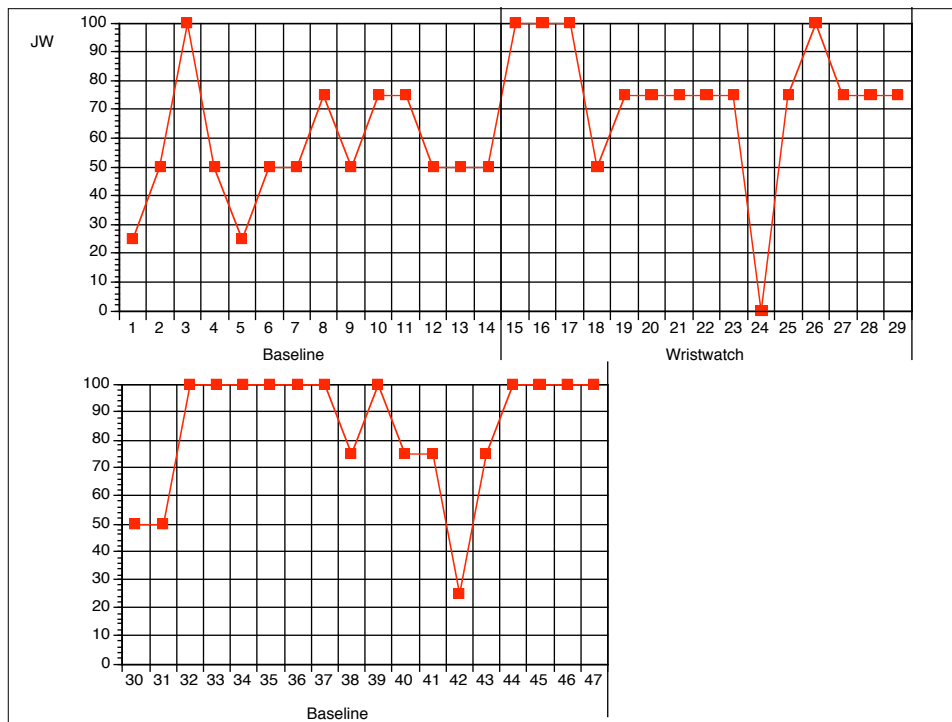
–When not done independently within 15 minutes of scheduled time, staff approached participant, informed him of the oversight, dispensed medication, supervised marking “taken” box, and circled the word “cued” on medication card

•Each evening, medication cards were collected and returned to the researchers

Results

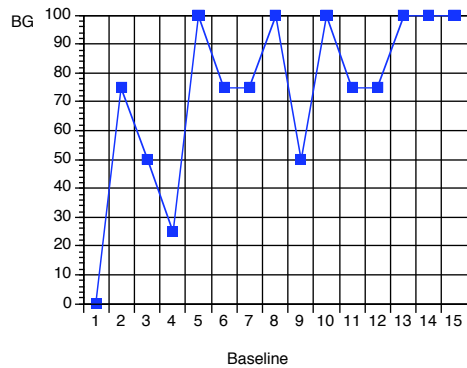
JW

- JW completed the initial baseline phase, the first treatment phase using the WatchMinder, and the second baseline phase (i.e., A-B-A). When JW achieved 100% independent use for the final 4 days of the “A” phase, he was terminated from the study.



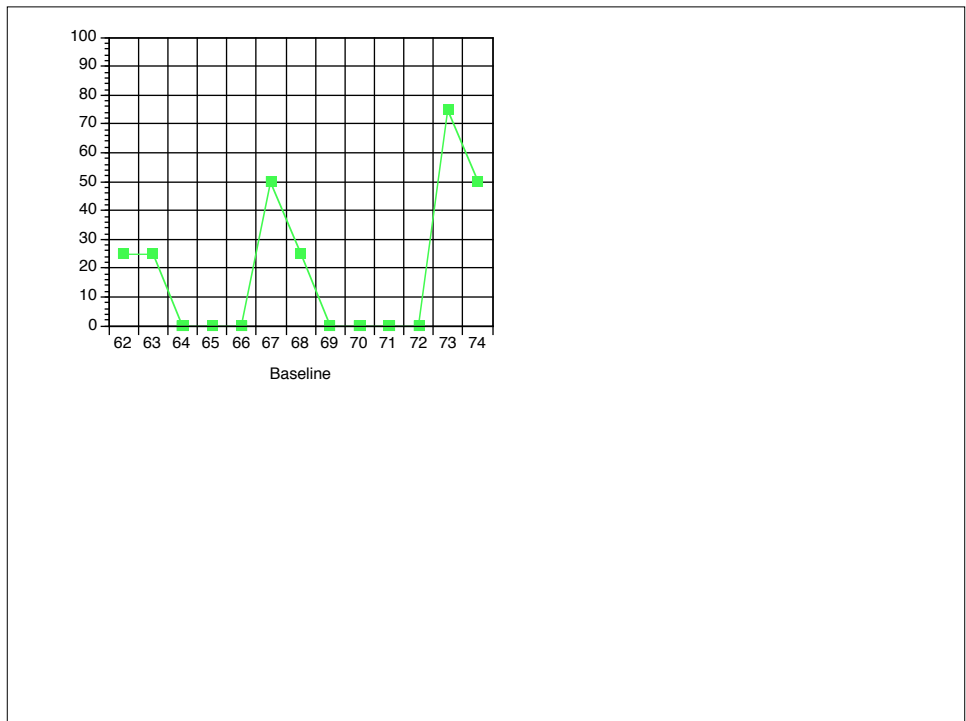
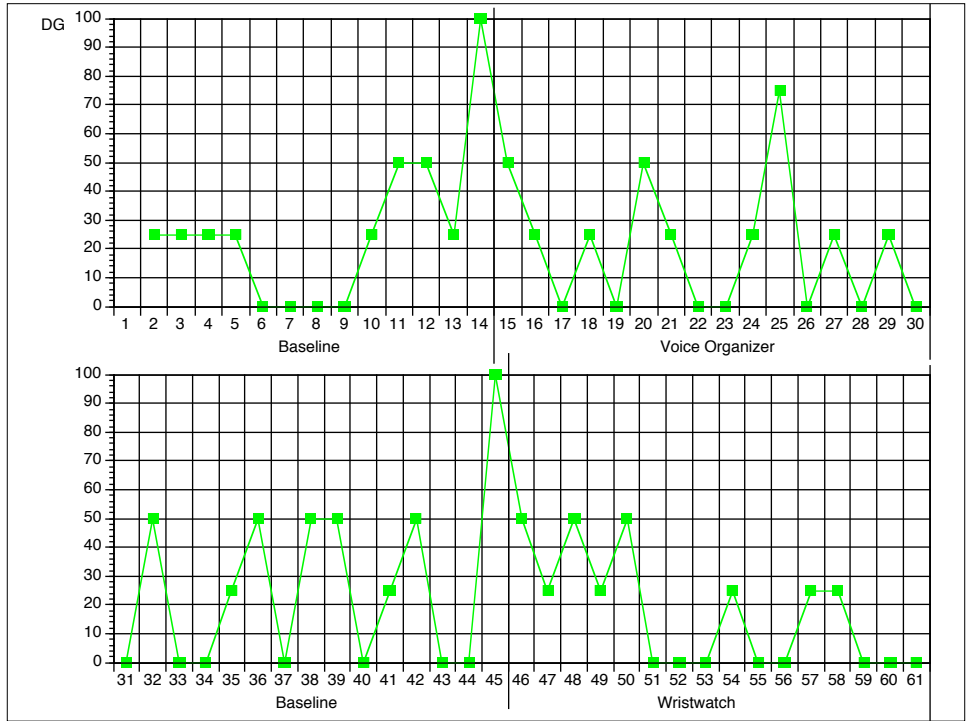
BG

- BG completed the first baseline phase only. During this phase, he improved gradually, but consistently. Across the first 4 days, he performed with 37.5% independent use. Across the final 4 days, he performed with 93.75% independent use and was terminated from the study.



DG

- DG completed all five experimental phases. DG's independent use scores varied from 0% to 75% daily but never showed any improvement within or across phases. He remained dependent on staff to remind him about medications at the study's completion.



Discussion

- Despite having previously participated in training focusing on strategies to remember to take medications, none of the three participants were independent at the start of the study
- Two of the three participants performed independently by the end of the study
- Each case example illustrates a unique compensatory learning pattern.

Learning patterns

- JW's learning pattern was one of slow, but continuous, improvement across the first treatment phase. He could then carry-over and continue building on his increased awareness of medication scheduling. During the second baseline phase, despite no use of an AT device, JW improved sufficiently to warrant termination from the project.

- BG only needed written reminders to take his medication. Although this seems simplistic, until participation in this research, no such reminders were available to him, and he was dependent on nursing staff to dispense medications. BG appears only to have needed minimal support and an opportunity to attempt independence.

- DG's learning pattern was the only one that did not show improvement with progression through the project. He showed a pattern of continued day-to-day variability regardless of written cues or use of AT devices.

Clinical Application

Clearly, all survivors of TBI are unique in their residual strengths and weaknesses. A challenge for professionals is to develop and implement novel treatments to compensate for persistent deficits. As shown through the case examples, previous failure in mastering compensatory strategies does not mean subsequent endeavors will also fail. Indeed, two of the three cases rapidly progressed to the point of study termination.