Systematic Evaluation of the Television Assisted Prompting (TAP) System for Adults with Acquired Brain Injury

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Evaluate the efficacy of TAP to deliver automated, multi-media prompts and reminders on a person’s home television to improve completion of preferred, non-preferred, and neutral routine and non-routine tasks.

**PURPOSE**

- Cognitive impairments in prospective memory following acquired brain injury (ABI) can present significant barriers to task completion and life participation.
- Objective: To examine the efficacy of TAP to deliver automated, multi-media prompts and reminders on a television system.

**BACKGROUND**

- Alzheimer’s patients with self-selected, customised prompts increased task completion from baseline means near chance (~50%) to near 75% among adults with cognitive impairment (Wilson et al., 2001; 2005).
- Smartphone users can prompt an individual with moderate-severe memory impairment to improve completion of scheduled phone calls, maintaining a calendar, and checking email (a non-preferred task) over baseline levels (Sobotka & Richards, 2009).
- Cellular phones useful to improve recall of therapy goals when text messages were automatically sent three times daily compared to no prompting among a group of adults with TBI (Culley & Blythe, 2005).
- Task management systems (e.g., calendars, wall charts, and notebooks) commonly used among ABI survivors (Evans et al., 2003).
- Desired features of AT devices reported by survivors of moderate-severe ABI included: simplicity, availability of technical support, and long-lasting battery power for purposes of money management, remembering things to do, and remembering what people say (Hart et al., 2004).
- Barriers to AT device use include cost, training, anxiety with technology, non-intuitive nature (Lemencello, 2008).

**METHODS**

- Design: A randomized-within-group crossover controlled experiment examined the effects of TAP versus TYP (typical practice) reminders on completion of six self-selected tasks: two preferred, two non-preferred, and two control tasks (1 routine and 1 random).
- Participants: 26 adults with ABI who met selection criteria were recruited. They were randomly allocated to Group A or Group B. The group main effect was significant, with Group B performing higher overall (M = 68) than Group A (M = 47). This may be due to greater improvement in executive functioning in Group A (measured by Modified Behavior Rating Scale of AHEAD), with fewer Group A participants also living independently.
- Exclusion criteria included: documented diagnosis of ABI; at least 12 months post-onset; at least 18 years of age; cognitive challenges that limit completion of routine and non-routine tasks; ability to communicate verbally; willingness to participate; and no known sensory impairment.
- Recruitment: Recruitment was done via local advertising, ABI support groups, and through rehabilitation specialists.
- Intervention: Participants were randomly assigned to Group A or Group B. Two preferred tasks were selected as tasks that participants had difficulty with at baseline; both improved with TAP prompting. Two non-preferred tasks were selected as tasks that participants had difficulty with at baseline; both improved with TAP prompting. Two control tasks were selected as tasks that participants found easy at baseline; both improved with TAP prompting. Three different prompts were created per task: preferred, non-preferred, and control.
- Data collection: Preferences were obtained by participants completing a Consumer Survey (Hart et al., 2004). Data were collected during three time periods: baseline, Week 1, and Week 2. All data were collected by the researchers.
- Data analysis: Data were analyzed in SPSS using a Mixed Model with clustered data for group assignment. The fixed effect IVs included: group (A or B); task type (preferred, non-preferred, or control); prompting condition (TAP or TYP); and time (time 1 or 2). The fixed effects were entered into HLM simultaneously using Type III SS. The mixed model results are shown below.

**RESULTS**

- Adults with ABI completed more of their self-selected tasks when provided with automated, multi-media, customized prompts than when provided with their typical practice (TYP) for remembering to complete tasks. This was a medium-large effect.
- There was not a significant difference between TAP or TYP conditions for preferred and non-preferred tasks; participants completed both types of self-selected tasks with about the same completion rates within the TAP or TYP conditions.
- Participants completed more control tasks with TAP compared to TYP; this difference was significant for control task 1 (making a random phone call in the research lab during Week 2, 3x/week).
- There were observed differences not due to a novelty effect with the TAP technology; performance did not significantly decline during the second TAP condition

**DISCUSSION**

- Results are consistent with the ATC literature, showing that people with ABI improve task completion from near chance levels to near 75% with automated, customized prompts (Wilson et al., 2001; 2005).
- Participants were randomly assigned to group. Group B was a larger group, with higher overall performance, which may be due to greater improvement in executive functioning in Group A (measured by Modified Behavior Rating Scale of AHEAD), with fewer Group A participants also living independently.
- Participants unanimously endorsed the TAP system as helpful to remember and complete prompted tasks. Despite occasional technological challenges (e.g., did not turn on/off; unable to update content due to Internet connectivity problems), 21/22 (95%) participants recommended TAP as potentially useful to other survivors of ABI with memory challenges; “It's very valuable if you live alone. It helps you get what you need to do.”
- "Things that normally would not have gotten done got done.”
- "It’s very easy and easy to use. It takes a lot of the struggle or guess work out of your daily life.”

- Participants also reported features to improve the TAP system; such as: increased flexibility in daily scheduling; greater control over scheduling (possible as part of the research project); greater mobility for prompting when not in the TV room; more assistance with flexibility in daily scheduling; greater control over scheduling (not possible as part of the research project); greater control over scheduling; more assistance with flexibility in daily scheduling; greater control over scheduling (not possible as part of the research project).

**CONCLUSIONS**

- Adults with ABI completed more of their self-selected tasks when provided with automated, multi-media, customized prompts on their home television versus their typical practice (TYP) for remembering to complete tasks. This was a medium-large effect.
- There was not a significant difference between TAP or TYP conditions for preferred and non-preferred tasks; participants completed both types of self-selected tasks with about the same completion rates within the TAP or TYP conditions.
- Participants completed more control tasks with TAP compared to TYP; this difference was significant for control task 1 (making a random phone call in the research lab during Week 2, 3x/week).
- As a group, participants did not develop new routine behaviors following 2-4 weeks of TAP prompting (TYP performance remained low during time 1 and time 2).
- Observed differences were not due to a novelty effect with the TAP technology; performance did not significantly decline during the second TAP condition

**REFERENCES**


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