Technology-aided verbal instructions to help persons with mild or moderate Alzheimer's disease perform daily activities

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ABSTRACT

These two studies extended previous research on the use of verbal instructions and support technology for helping persons with mild or moderate Alzheimer's disease perform daily activities. Study I included seven participants who were to carry out one of two previously targeted activities (i.e., either coffee preparation or table setting). Study II included four participants who were to carry out two new activities (i.e., preparation of a fruit salad and of a vegetable salad). The effects of activity engagement on mood (i.e., indices of happiness) were assessed by recording the participants' behavior during the activity trials and parallel non-activity periods. The participants of Study I reached percentages of correct activity performance, which normally exceeded 85. Five of them also showed higher indices of happiness during the activity trials as opposed to the non-activity periods. Three of the participants of Study II reached high percentages of correct performance on both activities available. One of these participants also showed higher indices of happiness during the activity trials. The findings were discussed in relation to previous research outcomes and in terms of their practical implications for intervention programs.

1. Introduction

Alzheimer's disease is an irreversible neurodegenerative condition that brings about a progressive decline in memory and higher cognitive functions as well as an increasing difficulty in the performance of daily living activities (i.e., self-help and occupational or domestic activities) (Arkin, 2007; Fernandez, Mainoiloff, & Monti, 2006; Giovannetti et al., 2007; Gitlin et al., 2008; Graff et al., 2008; Raggi et al., 2007). The disease is also associated with negative social-emotional effects such as withdrawal and depression (Appleby, Roy, Valenti, & Lee, 2007; Onor et al., 2007; Tsuno & Homma, 2009; Williams & Tappen, 2007, 2008; Wood, Womack, & Hooper, 2009).

Pharmacological research efforts to alleviate the condition of persons with Alzheimer's disease and slow down their degenerative process have mainly focused on the use of antioxidants, acetylcholinesterase inhibitors, and the N-methyl-D-aspartate receptor-antagonist, memantine (Bonda et al., 2010; Citron, 2010; Farlow & Cummings, 2007; Saddichha & Pandey, 2008). Behavioral research efforts to improve the adaptive behavior of these persons have concentrated, among others, on

forms of multisensory stimulation such as snoezelen (Staal et al., 2007; Verkaik, Van Weert, & Francke, 2005), occupational therapy (Graff et al., 2008; Wood et al., 2009), reality orientation therapy combined with attention and memory exercises (Mimura & Komatsu, 2007; Onder et al., 2005), and recovery of daily activities (Engelman, Altus, Mosier, & Mathews, 2003; Mihailidis, Boger, Canido, & Hoey, 2007; Wood, Harris, Snider, & Patchel, 2005).

Research efforts aimed at devising strategies to support the performance (recovery) of daily activities are based on the assumption that the persons' ability to carry out those activities is a way to counter their decline, frustration (depression) and withdrawal and to promote their self-determination, alertness, and social image (Boger et al., 2006; Giovannetti et al., 2007; Labelle & Mihailidis, 2006; Mihailidis et al., 2007; Phinney, Chaufhury, & O'Connor, 2007; Vernooij-Dassen, 2007; Wood et al., 2005, 2009). One of the strategies, which has been successfully used in recent studies in this area, consists of (a) verbal instructions directed at guiding the participants' execution of the activity steps and (b) support technology designed to help the participants manage the aforementioned instructions efficiently and with limited effort (Lancioni et al., 2008; Lancioni, Pinto, et al., 2009; Lancioni, Singh, O'Reilly, Sigafoos, et al., 2009; Lancioni, Singh, O'Reilly, Zonno, et al., 2009). The activities targeted in these studies included morning-bathroom routine, shaving, dressing, table setting, coffee and tea preparation, snack preparation/sharing, and use of make-up. A total of 29 participants were involved in the studies. Data generally indicated performance improvement. For a number of participants, mood expressions (i.e., indices of happiness) were also recorded during activity and non-activity periods and some evidence was found of the positive effects of activity on those expressions (Lancioni, Pinto, et al., 2009; Lancioni, Singh, O'Reilly, Sigafoos, et al., 2009).

These two studies extended previous research with the involvement of new participants and activities to (a) further investigate the applicability and dependability of the strategy described above, (b) identify other activities that could be added to those already evaluated and thus expand the range of occupational options available in this area, and (c) help clarify whether activity engagement can positively influence these persons' mood (i.e., increase their indices of happiness). Specifically, Study I included seven new participants who were to perform one of two previously targeted activities (i.e., either coffee preparation or table setting). Study II included four new participants who were to perform two new activities (i.e., preparation of a fruit salad and of a vegetable salad). The new activities were chosen on their assumed suitability and social relevance. The effect of activity engagement on indices of happiness was assessed by recording the participants' behavior during the activity trials and during parallel non-activity periods.

2. Study I

2.1. Method

2.1.1. Participants

The participants, Anne, Sara, Tim, Jacob, Terry, Nicole, and Francis (pseudonyms), were between 61 and 83 ($M = 73$) years of age and were considered to function within the moderate range of the Alzheimer's disease. Their scores on the Mini-Mental State Examination (Folstein, Folstein, & McHugh, 1975) were between 11 and 17, with a mean of 14. Their scores on the Hamilton Depression Rating Scale (17-item version) (Bagby, Ryder, Schuller, & Marshall, 2004) were between 12 and 24, with a mean of 18 (indicating mild or moderate depression). They were known to be passive or erratic in relation to daily activities. However, they seemed to possess (and control) the motor schemes required for the steps of those activities and to respond to verbal instructions. Those instructions were generally effective in guiding them through the activity steps and ensuring their performance. They were living at home with their spouse who was directly involved in their care with some help from other members of the family or external caregivers. They could be involved in some daily activity within their home context (i.e., through caregivers' assistance), could share short walks within their neighborhood and could also be involved in brief visits to friends' homes. Pharmacological treatment for the Alzheimer's condition was available in the form of acetylcholinesterase inhibitors (Jacob), antioxidants and acetylcholinesterase inhibitors (Francis), and acetylcholinesterase inhibitors and memantine (Nicole). The study was approved by an ethics committee and received formal consent from the participants' families.

2.1.2. Setting, activities, data recording, and reliability

The study was carried out in the participants' homes. Anne, Sara, Tim, and Jacob were involved in the coffee-preparation activity. Terry, Nicole, and Francis were involved in the table-setting activity. Coffee preparation consisted of 12 steps. Table setting consisted of 14, 16 or 20 steps for the different participants. Tables 1 and 2 report lists of 12 and 16 steps and general instructions that were available for the two activities, respectively. The instructions (recorded by research assistants) involved some variations in the terminology used for the participants as well as repetitions, that is, they could frequently be uttered twice in succession (Lancioni, Singh, O'Reilly, Zonno, et al., 2009).

Data recording concerned the participants' performance of the activity steps (see Tables 1 and 2) and their indices of happiness (i.e., smiling, laughing, and/or excited vocalization) (Lancioni, Singh, O'Reilly, Oliva, & Basili, 2005; Moore, Delaney, & Dixon, 2007). The activity steps were recorded by research assistants during baseline and intervention trials. A step was recorded as "correct" if it matched the description of that step and occurred independent of prompting by research assistants (see below). The indices of happiness were recorded from the videotapes of the intervention/activity trials (which also allowed to determine the duration of those trials) and of parallel non-activity trials. The recording occurred according to a partial interval system, in which 10-s observation intervals were followed by 5-s scoring periods. The 10-s intervals were