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Persons with moderate Alzheimer's disease use simple technology aids to manage daily activities and leisure occupation

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ABSTRACT

Two studies assessed technology-aided programs to support performance of daily activities and selection/activation of music items with patients with moderate Alzheimer's disease. In Study I, four patients were presented with activity-related pictorial instructions via a computer fitted with inexpensive, commercial software. In Study II, four patients were (a) presented with different music options and (b) allowed to select and activate the preferred option via a microswitch response. Study I showed that each patient learned to perform the two activities available with percentages of correct responses exceeding 85 by the end of the intervention. Study II showed that all patients learned to choose and activate music options. Psychology students, employed in a social validation check, scored the patients' behavior within the program better than their behavior in a control situation. The relevance and usability of simplified pictorial-instruction programs and music choice programs for patients with moderate Alzheimer's disease were discussed.

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1. Introduction

Persons affected by Alzheimer's disease experience a progressive decline of their condition with a gradual loss of their independence in daily functioning (Ambrose, 2012; Bernick, Cummings, Raman, Sun, & Aisen, 2012; Melrose et al., 2011; Perry, Monaco, Fadda, Caltagirone, & Carlesimo, 2014; Sikkes et al., 2013; Soto et al., 2012; Spalletta et al., 2012; Wilson et al., 2012). Indeed, they grow progressively less competent in important areas involving, among others, (1) managing medication and finances (Campbell et al., 2012; Cotrell, Wild, & Bader, 2006; Marson et al., 2000), (2) using typical communication

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means to interact with family and friends (e.g., using the telephone) (Nygård & Starkhammar, 2003, 2007; Perilli et al., 2012; Selwyn, Gorard, Furlong, & Madden, 2003), (3) performing daily activities such as preparing food (Lancioni et al., 2010; Martyr & Clare, 2012; Mihailidis, Boger, Canido, & Hoey, 2007), (4) managing orientation and travel within circumscribed and familiar places, such as home or day center (Caffò et al., 2012; Lancioni, Perilli, et al., 2013; Provencher, Bier, Audet, & Gagnon, 2008), and (5) engaging in recreation activities such as listening to music (Clément, Tonini, Khatir, Schiaratura, & Samsony, 2012; Lancioni, O'Reilly, et al., 2013; McHugh, Gardstrom, Hiller, Brewer, & Diestelkamp, 2012).

In an attempt to slow down the apparently inevitable deterioration of these patients and maintain their basic adaptive skills for a longer time, professionals have resorted to two strategies. One strategy concerns pharmacological interventions, such as the use of memantine and acetylcholinesterase inhibitors (Darreh-Shori & Soininen, 2010; Ferris & Farlow, 2013; Konrath, Passos Cdos, Klein, & Henriques, 2013; Massoud & Léger, 2011; Rive et al., 2012; Tayeb, Yang, Price, & Tarazi, 2012). The other strategy concerns behavioral interventions, such as the use of reality orientation exercises, memory training, and stimulation enrichment (Bier et al., 2008; Boller, Jennings, Dieudonné, Verny, & Ergis, 2012; Cotelli, Manenti, Zanetti, & Miniussi, 2012; Silverstein & Sherman, 2010; Small, 2012; Takeda, Tanaka, Okochi, & Kazui, 2012; Zanetti et al., 2001).

Recently, behavioral intervention strategies supplemented by technology aids have been aimed at supporting the patients' (a) daily activities, (b) orientation and travel within familiar indoor areas, and (c) telephone communication with their family and friends (Caffò et al., 2014; Lancioni et al., 2011, 2012; Perilli et al., 2012; Perilli, Lancioni, Laporta, et al., 2013). For example, the strategies for helping the patients perform daily activities were based on the automatic (technology-regulated) presentation of instructions for the single steps of the activities targeted. The instructions, which varied across studies from verbal to visual, proved largely effective (Lancioni et al., 2008, 2010, 2011; Perilli, Lancioni, Hoogeveen, et al., 2013). Verbal instructions consisted of brief phrases describing the operations required by the single steps of the activities. Visual instructions consisted of (a) static pictorial or photographic representations of the material involved in the activity steps or (b) dynamic representations, that is, video clips of the operations required by the activity steps.

The first of the two studies reported here was aimed at extending the research on pictorial instructions for supporting daily activities in patients with moderate Alzheimer's disease. Specifically, it investigated the applicability and effectiveness of the simplest (most readily affordable) of the strategies so far tested (Lancioni, Singh, O'Reilly, Sigafoos, et al., 2013). Such strategy is based on static pictorial representations, which are presented through a laptop computer fitted with inexpensive video editing software (Pinnacle Studio, version 14, by COREL; www.pinnaclesys.com). The software allows staff to program (a) the time intervals between instructions (i.e., the time intervals that the computer has to wait before moving from one specific instruction to the next) and (b) the sound cues alerting the patients as soon as a new instruction appears. The second study assessed basic technology-aided strategies that would allow the patients to choose music items on their own rather than relying on others, as it often happens within daily settings (Chatterton, Thy, Baker, & Morgan, 2010; Ferrero-Arias et al., 2011; Lancioni, O'Reilly, et al., 2013; Raglio et al., 2010; Wall & Duffy, 2010). In practice, the patients (a) were to use a simple computer system, which presented them with different music options (e.g., different music styles and different singers or songs), and (b) could choose the preferred option through a small hand-pressure response performed on a microswitch that they had in their hand.

Based on preliminary data (Lancioni, Singh, O'Reilly, Sigafoos, et al., 2013), one might expect Study I to provide new, satisfactory evidence in support of the simple strategy with pictorial instructions. Any such evidence would be considered practically relevant, as most daily contexts can be more easily inclined to adopt technology-aided intervention strategies when these are relatively easy to arrange as well as inexpensive (Godwin, Mills, Anderson, & Kunik, 2013; Nijhof, Van Gemert-Pijnen, Burns, & Seydel, 2013; Riikonen, Mäkelä, & Perälä, 2010). Study II was expected to indicate a way to help patients with moderate Alzheimer's disease maintain an active role (self-determination) during a leisure occupation known to be beneficial and enjoyable for them. An active role would be important to counter, at least temporarily, their tendency to passivity and marginality with possibly positive implications for their general enjoyment and status (i.e., the way they are perceived by others) (Fischer, Langner, Birbaumer, & Brocke, 2008; Lancioni, O'Reilly, et al., 2013). To assess these points, a social validation check was carried out with university psychology students rating the patients during sessions of Study II and during control sessions in which staff arranged music stimulation for them (Callahan, Henson, & Cowan, 2008; Lancioni et al., 2006).

2. Study I

2.1. Method

2.1.1. Participants

Four patients (Jenny, Rosy, Annette, and Trudy) of 74–90 ($M = 80$) years of age participated. They were considered to function at a moderate level of Alzheimer's disease with scores of 15–20 on the Mini-Mental State Examination (Folstein, Folstein, & McHugh, 1975). Annette and Trudy were also reported to have a mild form of depression for which they received specific medication. Pharmacological treatment for the Alzheimer's condition, at the time of the study, was available for Jenny and Annette in the form of acetylcholinesterase inhibitors. Three criteria were followed for the inclusion of these patients in the study. First, they were no longer capable of performing simple and relevant daily activities, such as making tea and preparing a fruit salad or a snack. This inability reduced their opportunities of functional engagement within their living context. Second, in spite of such inability (closely linked to their difficulties to remember the sequence of steps involved in

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